Mizoram PHARMACISTS 2009

Published by
Mizoram Pharmacists' Association
in collaboration with Mizoram State Pharmacy Council

MIZORAM PHARMACISTS : 2009

EDITORIAL BOARD

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MESSAGE

Mizoram Pharmacists' Association leh Mizoram State Pharmacy Council tangkawpin National Pharmacy Week 2010 an hmang leh hemi puala Magazine 'Mizoram Pharmacists' buatsaih a ni thei hi lawmawm ka ti hle a ni.

Pharmacist-te hi damdawi enkawl, siam leh hmuhchhuah kawngah a bika zirna nei in nih avangin mithiam in ni a, in thiamna te nasa zawka hmang tangkai leh zual turin ka duh che u a. Mipui tana him zawka damdawi enkawl kawngah leh Drugs Control kawngah te nasa taka tan la zual turin ka duh che u a ni.

Mizoramah ramhmul damdawi tam tak hmuhchhuah tur a awm niin an sawi thin a, he lam kawnga research in beihna thawm te hriat tur a awm thin a, lawmawm ka tiin nasa zawka bei zel turin ka duh che u a, hmuhchhuah duhawm tak in neih theih nan duhsakna ka hlan bawk che u a ni.

He Magazine hi a chhiartu apiang tana hlawkpuina hlu tak ni turin duhsakna sang ber ka hlan e.

(LALRINLIANA SAILO)

Dr. H. LALHLENMAWIA
PRESIDENT
MIZORAM PHARMACISTS' ASSOCIATION

MESSAGE

National Pharmacy Week 2010 kan thlen hian Pharmacists zawng zawngte chibai ka buk a che u. He hun puala magazine buatsaih 'Mizoram Pharmacists' tihchhuah a lo ni leh ta hi kan lawm hle mai a, a buaipuitu, Editorial Board te leh articles thawhtute chungah lawmthu ka sawi bawk e.

Pharmacists, hmun hrang hranga thawkte, kan hna theuhvah rinawmna leh taimakna vawng nung zel turin ka chah duh che u a. Kan thiamna leh ropuina a taka hmang chhuak ngei thei turin tan lak zual a pawimawh hle a ni. Ni tinin khawvelah technology thar a chhuak a, mahni thiamna tuai thar reng a ngai a ni tih hriain, inzir thar reng turin ka chah duh che u a ni.

Hun reiloteah B.Pharm (Pharmacy Practice) course D.Pharm-te tan zir theihin Pharmacy Council of India-in a buatsaih dawn a, D.Pharm zawng zawng ten B.Pharm (Pharmacy Practice) kan neih a tul dawn a ni. Vawiin atangin lo inbuatsaih lawk a tul hle mai.

Pharmacists kan nih angin damdawi thar ngaihven a, a nihna zirchiang hmasa thintu kan nih a ngai a, damdawi reng reng mi dangte zirtir turin kan hriat chian tawk a tul hle a ni.

Mizoram Pharmacists' Association member zawng zawngte tluang taka in hna thawk chhunzawm zel turin duhsakna ka hlan a che u.

Mizoram Pharmacists' Association dam reng rawh se.

Sd/-
Dr. H. Lalhlenmawia

LALSAWMA PACHUAU
PRESIDENT
MIZORAM STATE PHARMACY COUNCIL

MESSAGE

Dear friends,

It gives me immense pleasure once again, in writing this message to all my fellow Pharmacists across the state. It is the third issue of this kind to be published by the Mizoram Pharmacists' Association in collaboration with the Mizoram State Pharmacy Council. I take pride and loudly applaud all the members; who rendered their valuable services and thoughts for the successful publication of this magazine 'Mizoram Pharmacists'. As we all know, to publish any kind of magazine, there must be some persons, who untiringly works behind the scene. Therefore, I must admit and recognise the Editorial Board members for their wonderful works.

In the past, there was a feeling that, the importance of Pharmacist as a healthcare team was ignored by the government as well as the general public. But due to the hard work of the Pharmacy Council of India, the profession of Pharmacy has reshaped its form and regain our actual status. To achieve this goal, every Pharmacists has a big role to play by fulfilling our day to day duty and say, "I did it," "You did it," "We did it."

To end up my message, I want to ask each one of us this simple question: "Have you registered yourself in the State Pharmacy Council?" This is very important for every Pharmacist to register his name in the Pharmacy Council as it is our legal obligation to do so in order to practise our profession.

I do wish that this small publication shall enrich our technical knowledge and enlighten all Pharmacist working in different parts of the state and let us remember once again, "It is never too late to learn new things."

(LALSAWMA)

EDITORIAL

It gives me immense pleasure to bring out 'Mizoram Pharmacists 2009', as a part of the celebration of National Pharmacy Week 2009.

First of all, I would like to express my sincere thanks to Mr. Lalrinliana Sailo, Minister of Health and Family Welfare; Mr. Lalsawma , President of Mizoram State Pharmacy Council and Dr. H.Lalhlenmawia, President of Mizoram Pharmacists' Association for their wonderful and inspirational messages.

The birth of this magazine is with the hope and intention that it will be a well of knowledge regarding health care, drugs and its uses and a platform for students and researchers to bring out their scientific ideas and works. The magazine also gladly embrace writers from various walks of life who are interested in contributing to the society in various fields.

I express my sincere gratitude to all the writers who contributed articles for this magazine and also to all the advertisers. Without you it would not have been possible to publish this magazine.

I thank my colleagues - Members of the Editorial Board and the Staffs of Mizoram State Pharmacy Council Office for their kind support and cooperation, it's a pleasure working as a team.

It hope all the readers will be enlightened through this magazine and spread their knowledge for the betterment for our society.

P.C. Lalawmpuii

(P.C. LALAWMPUII)

GENERAL SECRETARY'S REPORT

Lalvuana
Secretary
Mizoram Pharmacists' Association

Mizoram Pharmacist's Association General Secretary's Report pe theia ka awm hi ka lawm hle mai. MPA hi pawl hlun tak a ni a, kum 1963 daih tawh khan bul lo intan chhoin Mizorama pawl hriat hlawh tak a ni.

Kumin hian General Conference hman a ni dawn lo va, a chhan chu nikum 2008-a kan lo rel tawh ang khan, kum khat danah General Conference hi neih thin tawh ni se, kan tih vang a ni.

Pathian hruainain kumin hian National Pharmacy Week kan hmang thei a, a lawmawm hle mai. Hei hi member-te leh a bikin Executive Member-te thawhrimna leh inpekna vang a ni. Tin, zokhaw lam leh khawpuia awm member-te inpekna vang liau liau a ni e.

Mizoram Pharmacists-te hi hna kawng hrang hrangah mawhphurhna pawimawh tak tak thawkte kan ni a, heng Drug Control te, Institution lamah te, Industrial Pharmacy & Research lamah te, Community Pharmacy lamah te leh Hospital Pharmacy lama thawk te kan ni a; kan zavaia infinkhawm hi Mizoram Pharmacist's Association pawl zahawm tak leh ropui tak siamtute kan ni tih kan hriat reng a ngai a ni.

2009-2010 chhunga MPA hruaitute:

1.	President	-	Dr. H. Lalhlenmawia, Sr Lecturer, RIPANS
2.	Vice President	-	Pu C. Vanthuama, Head Pharmacist,Civil Hospital (Aizawl)
3.	General Secretary	-	Pu Lalvuana, Pharmacist, Civil Hospital (Aizawl)
4.	Joint Secretary	-	Pu Zothanpuia, Lecturer, RIPANS
5.	Finance Secretary	-	Pu R. Rodingliana, Head Pharmacist, Civil Hospital (Aizawl)
6.	Treasurer	-	Miss Lalhmingliani Pachuau, Quality Manager, MSACS
7.	Senior Adviser	-	Pu Lalsawma Pachuau, ADC, H&FW

Executive Members:

1. Lalhmingliana, Drugs Inspector, Aizawl 'E'
2. C. Lalhmachhuana, Demonstrator, Pharmacy Deptt, RIPANS
3. C. Zoliana (Rtd), Electric Ramthar Veng
4. K.V. Vanlalhruaia, Pharmacist, Central Medical Store, Zemabawk
5. H. Lalnuntluanga, Head Pharmacist, Central Jail, Tanhril
6. F. Vanlallawma, Head Pharmacist, Civil Hospital (Aizawl)
7. Esther L.T. Ralte, Pharmacist, MMU, Durtlang
8. Huntharchena, Head Pharmacist, Kulikawn Hospital
9. Lalngilneia, Drugs Inspector, Aizawl 'W'
10. Laldinsanga, Pharmacist, Synod Hospital, Durtlang
11. T.L. Rualawia, Head Pharmacist, Sairang, PHC
12. Vanlalhluti, Pharmacist, Dispensary, Luangmual Complex

Auditors:

1. P.C. Chawithuama, Drugs Inspector, Aizawl 'W'
2. Lalduhsanga Pachuau, Lecturer, Pharmacy Deptt, RIPANS

Executive Committee neih zat - 5

1. Dt 12.2.09 (Thursday) - Pu Lalsawma Pachuau, kan Senior Adviser te In, Durtlangah neih a ni a, anni chhung hian zanriah tuihnai tak min lo buatsaihsak avangin an chungah member-te kan lawm hle.
2. Dt 2.6.09 (Saturday) - Mizoram State Pharmacy Council Office, Zarkawtah neih a ni.
3. Dt 30.7.09 (Thursday) - Mizoram State Pharmacy Council Office, Zarkawtah neih a ni.
4. Dt 6.10.09 (Tuesday) - MR Bill Section Room No. 604, Civil Hospital, Aizawlah neih a ni.
5. Dt 1.12.09 (Tuesday) - Mizoram State Pharmacy Council Office, Zarkawtah neih a ni.

Hemi bakah hian thu pawimawh, bawhzui ngai thilah Office Bearers' Meeting neih a ni bawk, hetiangin:

1. Dt 23.01.09 khan Pharmacy Department Library, RIPANS-ah neih a ni a, zanriah tuihnai tak kan President te nupain an chenna, RIPANS Quarters-ah min buatsaihsak a, an chungah member-te kan lawm hle.
2. Dt 5.8.09 (Wednesday) - lndoor Pharmacy, Civil Hospital, Aizawlah neih a ni.
3. Dt 13.10.09 (Tuesday) - MSPC Office, Zarkawtah NPW 2009 Souvenir Editorial Board-te nen joint meeting neih a ni.
4. Dt 27.11.09 (Friday) - Pu Lalsawma Pachuau, ADC, Office chamber-ah Magazine Editorial Board member-te nen magazine chungchang ngaihtuaha thutkhawm a ni.

Awle tunah chuan kumin 2009 chhunga kan activities thenkhatte han tarlang ila:

1. Dt 9.6.09 khan Hon'ble Minister Pu Lalrinliana Sailo, H&FW Deptt a office-ah hmuin thingpui inpui a ni a, a hnuaia subject-te hi titipuina neih a ni a, presentation pawh theh luh nghal a ni.

   i) Drug Control Section hi Head of Office-a siam ni rawh se.

   ii) Drug Testing Laboratory din ni rawh se.

   iii) Medical Re-imbursement Bill, tuna Civil Hospital-a check ang hian Private hospital-a mite pawh hi Pharmacist-ten check vek ni rawh se.

   iv) Procurement Sections, DHS leh DHME-ah te hian Pharmaceutical Qualified-te dah ni ve rawh se.

Kan Minister hian min phurpui hle a, a tul dan ang zela hma min lakpui a tum thu min lo hrilh a, a chungah beiseina sang tak kan nei a ni.

He mi thu vek hi Dt 4.8.09 khan kan Chief Secretary Pu Vanhela Pachuau, a office-ah hmuh leh a ni a, ani hnenah pawh hian a chunga subject bawk khi sawipui a, lehkha pawh theh luh a ni a, ani hnen atang pawh hian beiseina sang tak kan nei a, tunah hian kan lehkhate tihhlawhtlinna tur file-in a thang mek a ni.

2. Pharmacy Act, Section 42, dan ang lova damdawi khawihna hmun thenkhatahte hian dan ang taka damdawi khawih tura hma lak ni se, tih bawhzuiin Mizoram State Pharmacy Council-ah lehkha thehluh a ni a, Council hmalakna a kal mek zel a ni.
3. National Pharmacy Week, 2009 chu programme hlimawm tak leh hlawkthlak taka hman mek a ni a, hemi denchhen hian Souvenir changtlung tak buatsaih a ni.

Kumin hian Pathian hruaina ropui tak kan chang a, member boral sunna hun hman thin chu hman a ngai lo hlauh hi a lawmawm hle mail. Pathian hnenah lawmthu awm rawh se.

Aw le, a tawp berah chuan MPA member zawng zawngte kan hma zawn theuha tih tur awmah hian kan profession humhim tur leh tihmasawn zel tur hian keimahni theuh hi kan pawimawh a. Taimak chhuah a, rinawm taka mahni zawn theuhah tan la thar turin kan inchah duh a; kan ram leh a chhunga cheng kan mihringpuite hriselna kawnga hmasawn zel tur hian Pharmacist-te hi kan pawimawh a ni tih hriain, Pharmacy Association peng hrang hrangte kan awm zel a, hengte pawh hian MPA hmasawnna turin ke i pen tlang zel teh ang u.

Ka lawm e.

++*+*+*+*+*+*+*

Ramhmul damdawi zirchian (Research), siam leh zawrh chungchang

K.Thanzami
Department of Pharmacy, RIPANS

Hmanlai atang tawhin ramhmul damdawite hi natna chi hrang hrang enkawl nan hnam hrang hrangin an lo hmang tawh thin a, tun thleng hian ram tam takah chuan natna enkawl nan ber an la hmang a ni. Tunlaia kan damdawi ei tlanglawn ber, 'allopathic drugs' kan tih mai thenkhat zingah pawh hian ramhmul damdawite atanga lakchhuah leh siam danglam (chemically modified) a awm. Entirnan, Malaria damdawi quinine chu Cinchona ledgeriana atanga lakchhuah a ni a, quinine sulphate te, quinine HCl salt te chu quinine siam danglam (chemically modified) a ni ve thung. Heng allopathic drugs-te hi natna tihdam kawnga an thawh chak zawk avangin ramhmul damdawi (herbal drugs) te aiin hman nasat an lo ni chho ta a ni. Hun a lo kal zel a, allopathic drugs te hian taksaa a tha lo lama hna an thawh theih dan (side effects) te zir chian a han nih chhoh tak chinah hian, hmanlaia damdawi atana an lo hman thin, 'Ayurvedic medicine' te, 'Chinese traditional medicine' te, 'Folk Medicine' an tih mai te hian ngaihsan an lo hlawh leh tan ta mek a ni. A chhan chu heng hmanlai damdawi te hi a tira an siamchhuah dan tlema a tha zawnga tidanglamin, natna a tihdam theih dante leh mihring tan an hlauhawm lo tih chiang taka an zir hnuah chauh zawrhsuma chantir an nih tak vang a ni. Chuvangin ram changkang zawk kan tih, Europe ram te leh America ram te chuan heng ramhmul damdawi kan tihte, anniin 'alternative medicines' tia an hriatte hi an rawn ngaihven tan leh tawh em em a ni.

Chutih lai chuan keini Mizote pawh hian kan pi leh pute atang tawhin ramhmul damdawi hi kan lo hmang ve nasa em em tawh thin a. Tun thleng hian ramhmul damdawi chi hrang hrang siam thin hi an la awm ve reng zel a . Heng ramhmul damdawi siamchhuah dampuite an lo awm ve zel avangin, damdawi tak takte pawh an lo ni ve reng thei bawk e. Amaherawhchu, heng ramhmul damdawite zirchian leh a siam dante uluk zawka duanchhuah kan tum hi a pawimawh tawh tak zet a ni.

A hmasa bera kan hriat tur chu, damdawi reng reng hi zirchian hmasak phawt loh chuan siama hralh chhuah phal an ni lo va. Entirnan, thlai pakhat, zunthlum damdawi atana tha nia rin chu sazu chi khatah enchhinna neih hmasak a ni phawt thin. Heng sazute hi zunthlum vei chawptirin, chumi hnuah chuan thlai

atanga dawihlo (chemicals) an lakchhuah chuan an enkawl ta a. Zunthlum damdawi atan a that ngei leh ngei loh an zir chian mai bakah taksa bung hrang dangah eng angin nge a thawh tih thlenga zirchian vek a ni thin. Chuta a lo tha ngei a nih pawhin, mihringa a thawh dan tur zirchianna (clinical trial) chhawng tam tak neih leh phawt a ngai a. Chuta a lo tha zel a nih chuan dan angin kha damdawi siam chhuah thar kha a neitu nihna (patent) a dil theih a ni. Patent a nih tawh chuan midangin khatiang ang damdawi kha a patent neitu phalna lovin an siam thei tawh lo. Damdawi patent neitu hian a duh chuan a neitu nihna kha damdawi siamtu company hnenah man to takin a hralh thei a. A nih loh pawhin, amahin a duh chuan damdawi siam phalna (manufacturing license) dilin zawrhsum atan a hmang thei bawk.

World Health Organization (WHO) chuan dan duangin, hmanlai atanga ramhmul damdawi lo hman tawh thin, a thatna hriat chian sa leh mihring tan engmah a pawina awm lo tih hriatsa a nih chuan a chunga kan tarlante paltlang kher lova ramhmul damdawi siam chhuah theih dan kawng a awm ve thei tho bawk. Hmanlai Mizo pi leh puten an ramhmul damdawi siam dan, chiang taka ziak min lo hnutchhiah ni se chuan heng damdawi siam leh zawrh te pawh hi awlsam zawkin, dan angin a tih theih mai tur a ni a. Amaherawhchu, chutianga ziak fel tak a lo awm si loh avangin ramhmul damdawi, kan pi leh pute lo hman tawh thin zir chian te, tunlai thiamna nena inmil zawnga siam that tum leh fel taka ziak (documentation) neihte hi thangtharte tih makmawh a ni.

Hmarchhak bial hian ram hnim leh thlai, khawvelin a la zirchian loh tam tak a nei ngah hle a. Chu chu state danga zirna in thenkhat, entirnan, National Institute of Pharmaceutical Education and Research (NIPER), Mohali, te chuan hriain project an siam a, hmarchhak bial hi an rawn tlawh tlut tlut mai a ni. Tun dinhmunah hi chuan Mizoram chhunga kan tih theih hi a tlem hle mai a. Hmanrua leh bawlhlo te kan nei tha lovin, kan ramin rohlu kan neih tlemte zinga pakhat, ramhmul damdawite zirchian hi a la harsa rih hle mai a. Amaherawhchu, tanpuina dilin sawrkar laipui hnuaia department hrang hrang, Department of AYUSH te, Department of Science and Technology (DST) te, Department of Biotechnology (DBT) te, University Grant Commission (UGC) te, All India Council for Technical Education (AICTE) te leh a dang dang te hnenah, zirna in nena tangkawpin project ziakin a thehluh theih a. Heng Department-te hian project kha an lo pawm chuan, ramhmul damdawi zirchianna atana mamawhte leina turin sum hmangin tanpuina an pe thei a ni. Mahse eng damdawi pawh hmuchhuak thar ila, a neitu nihna chu min tanpuitute hian min tawmpui thung ang. Chumi avang chuan kan sawrkar zahawm tak hian hma lain Mizoramin sum kan hmuh ve theihna (revenue) tur zinga pakhat, ramhmul damdawi zirchian theihna tura kan mamawhte hi han ngaihtuah thei se chuan ram leh hnam hmasawn nana thil tangkai tak a ni ngei ang.

DRUG INFORMATION CENTRE

K. Limasenla Longchar
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R.K. Johny Singh
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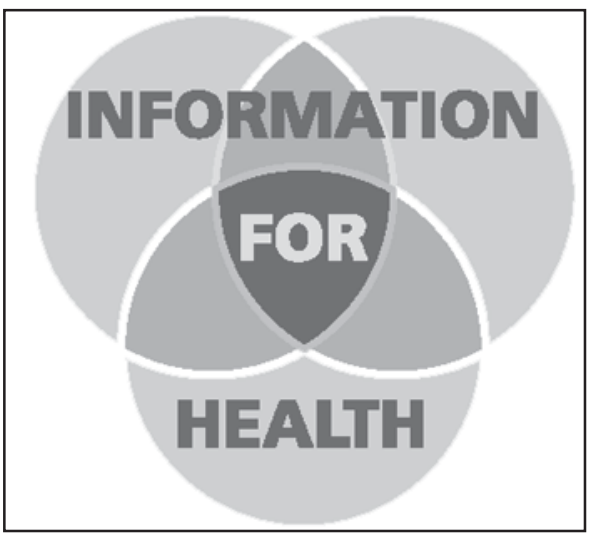
Irrational use of medicines is a major problem worldwide. WHO estimates that more than half of all medicines are prescribed, dispensed or sold inappropriately, and that half of all patients fail to take them correctly. Irrational use of drug in India is very rampant and with the passing of time, is only gaining more momentum. Poor drug regulation, lack of independent unbiased drug information, unethical promotion of products, and irrational prescribing are the main contributing reasons for irrational drug use in India. Some examples of irrational use of drugs encountered on a daily basis include overuse of antibiotics and antidiarrheals for nonspecific childhood diarrhea, indiscriminate use of injections in children, polypharmacy in geriatric population, use of antibiotics for mild non-bacterial infection, tonics and multivitamins for malnutrition. Thus the prevailing scenario necessitate the promotion of rational use of drug through Drug Information Centre (DIC) and Drug bulletin.



Rational Drug Use

Irrational drug use is a global phenomenon and only few prescriptions justify rational use of drugs. Failure to prescribe in accordance with clinical guidelines, inappropriate dispensing and inappropriate self-medications are important types of irrational drug use.

RDU integrates two major principles:

- Use of drugs according to scientific data on efficacy, safety and compliance
- Cost-effective use of drugs within the constraints of a given health system

According to The World Health Organization (WHO) rational drug use (RDU) requires that "Patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements , for an adequate period of time, at the lowest cost to them and their community".

Rational drug use is attaining more significance nowadays in terms of medical, socio economical and legal aspect due to following reasons:-

1. Drug explosion: Increase in the number of drugs available has incredibly complicated the choice of appropriate drug for particular indication.

2. Efforts to prevent the development of resistance of highly efficacious and life saving new antimicrobial drug.

3. Growing awareness.

4. Increased cost of the treatment which can be reduced by rational drug use.

5. Consumer Protection Act (CPA): Extension of CPA in medical profession may restrict the irrational use of drugs.

Drug Informations and Drug information Centre (DIC).

The term 'drug information' was coined in the early sixties. Drug Information is the provision of written and/or verbal information or advice about drugs and drug therapy in response to a request from other healthcare providers, organizations, committees, patients or members of the public. Drug Information Service is the activities undertaken by pharmacists in providing information to optimize drug use.

Drug Information Centre refers to a facility specifically set aside for, and specializing in the provision of drug information. The first drug information centre was opened in 1962 at the University of Kentucky Medical Centre with the purpose to provide accurate, current, and unbiased information for the promotion of rational drug therapy.

Sources of drug information

Drug information sources can be classified into three types: - primary sources, secondary sources and tertiary sources which covers from international databases,

journals and reference books to national or regional drug information centres, and locally produced formularies and bulletins. Information is available verbally or in written form, on tape or video, on-line or on CDROM. They can be commercial and independent, or non-commercial.

The primary sources are original articles on drugs use and safety or case reports in journals. E.g., British Medical Journal, New England Journal of Medicine, American Journal of Health Systems Pharmacy, Indian Medical Journal etc.

The secondary sources are review articles in journals, information available in Drug Bulletins, Abstracting Sources, Standard Treatment Guidelines, WHO Drug Information, Adverse Drug Reaction Bulletins etc.,

Tertiary source include general reference books and database like Micromedex. It is summarized information from multiple original articles. E.g., AHFS Drug Information (American Society of Health- System Pharmacists), Drugs in Pregnancy & Lactation, WHO Model Formulary, BNF (British National Formulary), Harrison's Principles of Internal Medicine, United States of Pharmacopoeia Dispensing Information etc

Some useful Internet Web resources

1. World Health Organization Library site: http://www.who.int/hlt/virtuallibrary/english/ subject.htm
2. Australian Prescriber: http://www.australianprescriber.com
3. British Medical Journal: http://www.bmj.com
4. The Free Medical Journal Site: http://www.freemedicaljournals.com
5. MEDLINE: http://nlm.nih.gov
6. Cochrane collaboration: www.cochrane.org
7. Biomail: http://biomail.sourceforge.net/biomail
8. SATELIFE: Free information services to health professionals: http://www.healthnet.org
9. Harrison's Internal Medicine: http://www.harrisoneonline.com

The drug information from commercial sources requires careful evaluation. Industry being also a major sponsor of scientific conferences and symposia, such information often emphasizes only the positive aspects of products and over looks or gives little coverage to the negative aspects. Thus it requires great discernment on the information available in the web unless the source is known to be authentic and unbiased.

Overview of drug information centres in india

In India Drug information centre came into existence only by 1990's. JSS college of pharmacy, Trivandrum Medical College and Karnataka State Pharmacy Council took the noble initiative of starting this drug based service providing information centres which were otherwise neglected. The Karnataka State Pharmacy Council established in India, the first independent Drug Information Centre in August 1997 to disseminate unbiased drug information to healthcare professionals. The centre is registered with IRDIS, an International Register of DRUG Information Services.

A project from WHO India County Office was given to Drug Information centre; Karnataka State Pharmacy Council for setting up of Independent/Hospital attached Drug Information Centres in selected states of India. As a result the following centres were set up with the intention to disseminate authentic and unbiased drug information to medical & paramedical professionals and patients /consumers. These centres started functioning from January 2007.

1) Assam

Institute of Pharmacy
Assam Medical College, Dibrugarh - 786002, ASSAM, INDIA
PH: 0373-2300903; 2301666 Fax: 2300080
E-mail: dicassam@gmail.com, dic_amc@yahoo.com

2) Chattisgarh

Institute of Pharmacy, Chattisgarh State Pharmacy Council
Quarter No. -77, Sector No. - 3, Geetanjali Nagar, RAIPUR (ChhattisgarhState), INDIA
Tel: (0771) 2444591 Fax: (0771) 2444591
E-mail: dicraipur@gmail.com, dicraipur@yahoo.com

3) Haryana

Lord Shiva College of Pharmacy
Near Civil Hospital, Sirsa-125055, HARYANA, INDIA
Tel: (01666) 240057 Fax: (01666) 242695
E-mail: dicharyana@gmail.com, dicsirsa@yahoo.co.in

4) Goa

Hindu Pharmacy
Cunha Rivara Road, P.B. No. 149, Panaji, Goa - 403001
PH: 0832-2223176; 2432903 Fax - 22237776
E-mail: dicgoa@gmail.com & dicpanaji@yahoo.com

5) Rajasthan

Rajasthan Pharmacy Council
Govt. Dispensary Campus
Sardar Patel Marg, Jaipur - 302006 PH: 0141-2228600 Fax: 2223041
E-mail: dicrspc@gmail.com

Role of Drug Information centre

Drug Information Centre should work towards promotion of safe, effective, rational and economic use of drugs by the health professionals and patients. Drug information centres should provide in-depth, unbiased source of crucial drug information to meet the needs of the practicing physicians, pharmacists and other health professionals in the following areas:

a) Choosing the correct drug therapy.

b) Adverse Drug Reactions.

c) Evaluation of Drug Reactions - The significance of a drug-drug, drug-food, drug disease or drug laboratory test interaction is evaluated.

d) Drug Administration - Information regarding drug administration techniques, preferred routes of administration and monitoring parameters for assessing efficacy and toxicity are provided.

e) Foreign Drug Identification - The DIC attempt to identify drugs obtained in other countries. When possible the DIC will provide product composition and US equivalent. An assessment of the efficacy and potential hazards of the product are also given.

f) Designing Dosage Regimens - Information regarding dosing pediatric patients, geriatric patients and other patients with special dosing requirements are provided.

Hospital attached Drug Information Centres can take part in activities such as:

a) Ward round participation
b) Provision of drug Information
c) Adverse drug reaction monitoring
d) Patient counseling
e) Research projects in co-ordination with the hospital

Basic requirements to set up a DIC in developing countries like India are

a) A trained and qualified person to provide drug information with knowledge of pharmacy and public health. He must be well trained especially in analyzing the quality of scientific publications and underlying research.

b) Updated drug information. Availability of all the three sources of information.

c) Financial support and office facilities. Consistent financial support to employ qualified person and to acquire latest upto-date drug information, through access to many international reputed journals and other online sources.

d) Create awareness to the public of the role of DIC

CONCLUSION

Drug information centres are the main players to give drug information to the consumers. Thus it plays a very pivotal role to curb the menace of Irrational Drug use. In order to reach out to the public Drug information services provided must be free, to further enhance approachability of the consumer to DIC, toll free telephone connection can be installed. It also is essential to create awareness of these services among physicians, pharmacists, nurses and consumers so that they utilize these services. Core competence and co-operation among all health care professionals in a health care facility is needed to promote rational drug use. National Human Rights Commission (NHRC) has recommended to the Government of India for setting up computerized drug information centres in large hospitals for the benefit of all concerned. Different people need different types of drug information e.g., health care givers (prescriber, dispenser etc), manufacturers and patients. Therefore, it is necessary for the DIC to provide drug information suited for the respective consumers, and promptly supply accurate information regarding the various fields and products. By sharing this information, the DIC can quickly identify issues and various risks and matters that could lead to substantial risks in the future and promptly consider responses to such issues and risks, and appropriately deal with them.

To successfully implement DIC in India, WHO's Rational Drug Use and the global concept of Drug Information Centre need to be contextualized according to India Healthcare system and implement it locally. Thus task of its successful implementation requires the role of Government - Central and State, Universities and Academic Councils, Professional Societies, Civil Society Organizations, Lay Press and Media, Court of Law, Pharmaceutical industries, Hospitals - Administrative Authority. Only when all these forces joined together and deliberate on the issues in India and come to a proper consensus then the concept of DIC can be effectively and efficiently implemented in India.

Damdawi
Hmuhchhuah leh Siamchhuah

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Thuhma: Damdawi hmuhchhuah leh siamchhuah hna hi damdawi siamtu industry-te tana kawng hautak leh senso sang em em mai a ni a. Nimahsela, a hun duh rei avangte leh hlawhtlin lohna tam tak awm theih thin avang tein pharmaceutical company te, zirna in te leh research institute te hian an duh angin he hna hi an kalpui thei mai bik thin lo a ni. Damdawi hmuhchhuah, siam puitling tur hian cheng vaibelchhe 400 atanga 600 vel senral a ni thin a, compound 6200 vel an sythesize atang hian pakhat vel bak damdawi puitlingah chhuah a ni ngai lo. Tin, a hmanna tur, natna eng atan pawh ni se, zawrh chhuah a nih hma hian kawng thui tak leh zirchianna leh tehna hrang hrang a paltlang a ngai bawk a ni.

Damdawi tur chu thlai emaw, leilung emaw, ran emaw, chemical synthesis hmang emawa lak chhuah a ni thei a. Heng an lak chhuahte hi natna enkawl nan a tlak tak tak em tih enchhin indawt dan tlangpui chu kawng thumin hetiang hian then a ni:

1) Screening
2) Preclinical development
3) Clinical studies

1) Screening:

Screening hi damdawi tur, a chunga kan sawi khawi maw ber atanga lak chhuah pawh lo ni se, natna enkawlna atan hman tangkai theih a ni dawn em, tih zawnchhuahna hmasa ber a ni. Hetah hian mihring timur chi hrang hrang leh rannung, entirnan, sazu,

sazupui, ui, zawng, guinea pig leh utawkah te enchhinna neih phawt a ni a. Damdawi enchhinna atana rannung an hmanah hian, natna eng emaw ber (pem, bp sang,kaih, peptic ulcer, zunthlum, etc.) damdawi tur hnathawh theihna ber tura rin chu, damdawi awm sa hmangin emaw an zuk thlentir phawt ta a, chutah chuan damdawi enchhin thar chuan natna siamchawpah chuan hna a thawk tak tak em, tih zira enchhin a ni thin.

He zirchhianna hmasaah hian damdawi atana hman theih tura rin tam tak hmuhchhuah thin a ni a. Tin, heng ran enchhin nana an hmante hi duh duh dana hman mai theih an ni hauh lo thung a ni. India ramah chuan heng ran, damdawi enchhinna atana hmante hi C.P.C.S.E.A. dan hnuaiah uluk taka kalpui thin niin zirna in te leh research lab ten an zawm tur, ran an hman vulh dan chungchangah te, an chaw ei tur leh an khawsakna turah te, an hriselna te leh hnimhlum pek leh tihhlum dan te thlenga uluk taka inkaihhruaina dan zam vek a ni.

2) Preclinical studies:

Damdawi hmuhchhuah chuan 'Screening' a kaltlang hnuin, mihringa zirchian a nih leh hmain uluk taka ran hmang bawka enchhin leh phawt a ni a. Hetah hian mihringah zirchian a dawl tak tak theih nan lo finfiah a ni thin. He hunah hian damdawi chuan mihringah hlauhthawnawm thil a thlen thei em? Lung tan te, thawkna lamahte, leh b.p.-ah te harsatna a thlen thei em tih finfiah phawt a ni a. Tin, damdawi chu engtia tam (dose) nge him tawk ang tihte leh, an taksaah damdawi chuan eng ang takin nge hna a thawh dan te leh an thih hnu thlenga an taksa awm dan chu zir a ni a. An tisa a khawih pawi theih dan thlenga enfiah vek ni lehin, hemi avang hian mihringa damdawi hna thawh dan tur tam tak a lo hriat lawk theih phah a ni.

He enchhinna hna hi felfai taka kalpui leh a nihna ang taka thawh a nih theih nan G.L.P. inkaihhruaina dan hnuaiah kalpui a ni a. Damdawia hman theih nia rin tam tak, Screening pawh kal tlang tawh, mahse mihringa natna kaihhnawih thei awm an hmuhchhuah leh si avanga a hnu lama hnawl leh tam tak a awm a. Hemi avang hian damdawi hmuhchhuah zaa sawmnga vel chauhin Preclinical studies hi an paltlang thin a ni.

3) Clinical trial:

Clinical trial chu damdawi, natna enkawlna atan a him tawk em, tih mihring hmanga enchhinna emaw zirchianna emaw a ni a. German ral len lai khan Nuremburg Trial tia hriat lar chu Nazi physician-ten an lo nei a. He Trial-ah hian lung-in tangte zingah anmahni duhthu pawh ni lovin physician-ten damdawi enchhin nan an hmang a, tang tam tak ramtuileilo an awm bakah tam takin an thih phah hial a ni. He thil thleng avang hian khawvel pumah mihringa damdawi enchhinna kawnga inkaihhruaina fel tak siam a tul a ni tih hriat chhuah a ni a. Kum 1964 khan World Medical Associa-

tion chuan mihring hmanga damdawi enchhinnaah inkaihhruaina a lo duang chhuak ta a ni. Tin, USFDA-te, EMEA -te lo ding chho zelin dan tam tak siam a ni a. Tunah chuan G.C.P. dan hnuaiah clinical trial hi kal chhohpui a lo ni ta a. India ramah pawh damdawi siamtu company-te chuan mihringa an damdawi siam an enchhin dawn chuan Drug Controller General of India hnenah phalna an neih phawt a ngai a ni.

Clinical trial hi damdawi-inahte neih a ni tlangpui a, hmun li-ah hetiang hian an then:

i) Thawh khatna (Phase I)

Mihring hrisel pangngai, mahni duhthlannaa inpe (volunteer) mi 20 atanga mi 80 inkarah damdawi chu zirchian a ni a. Hetah hian lungah te, thawkna lamah te, zunkawng, etc. ah te damdawi chuan pawi a khawih thei em tihte en a ni a. Tin, natna lo lanchhuah dan – luhai, luna, luakchhuakte a thlen thei em, tih te leh damdawi chu engzata tamin nge hna a thawh theih ang tih te zir thin a ni a. Kum khat vel he hun hian a duh a ni.

ii) Thawh hnihna (Phase II):

Damlo, volunteer mi 100 atanga mi 500 inkarah damdawi chu damlo taksain engtiang chiahin nge a lo dawnsawn, tih te leh engzata tam nge damlo tan damdawi chu chak tawk ang tih te, mihring taksaa damdawi kal dan te, insem darh dan te, a hnathawh dan te leh taksa atanga a inpaih chhuah dan thlengin an zir a ni. He hun hian kum khat leh kum hnih inkar vel a duh tlangpui a ni.

iii) Thawh thumna (Phase III):

Hetah hian damlo, natna nei bawk, mahse a hma aia tam, mi 1000 atanga 3000 hnenah damdawi chu zir leh a ni a. He hun hian a duh rei bakah a hautakin, senso a sang hle bawk. Kum thum atanga kum li inkar a duh a. Damdawi awm sa hman mek leh hmuhchhuah thar te hnathawh chu khaikhin a ni a. Hetah hian puitling damlo te bakah, tar leh naupang damlo te pawh hman an ni thin. He phase III hi damdawi hmuhchhuah chuan a paltlang a, him tawk leh natna enkawl nana tha tawka hriat a nih chuan damdawi siamtu company-te chuan an damdawi hmuhchhuah chu hralh phalna Drug Control Authority-ah an dil thei tawh a ni.

iv) Thawh lina (Phase IV):

Damdawi chu hralh chhuah a nih hnu pawhin la chhui zui reng a ni a. A hmaa la hmuhchhuah loh adverse effect, natna kaihhnawih, mihringa a thlente pawh la enzui zel thin a niin, hemi avang hian damdawi sût leh hralhchhuah khap leh te tam tak a awm reng a ni. Entirnan, Vioxx (rofecoxib), ruhseh atana hman chu lung a khawih pawi theih avangte leh zenga awm thutna a thlen a ni tih hmuhchhuah avangin Sept, 2004

khan khap a ni tawh a. Tin, rosiglitazone maleate, zunthlum damdawi paw'n thinlian a thlen thei a ni tih hriatchhuah a nih leh avangin zawrh chhuah khap leh bawk a ni.

Tlipna: Damdawi hmuhchhuah chu enchhin chhung a rei avangin damdawi puitlinga siam turin hun a duh rei hle a. Amaherawhchu, siamchhuah a nih meuh chuan tangkai taka mihring natna enkawlna atana hman a lo ni ta thin a ni.

Pharmacist-te hi damdawi hmuhchhuah leh siamah te a sulsutu kan ni a. Chu mai bakah, damdawiin mihringa hna a thawh danah te leh damdawi hman danah te kan pawimawhzia hi kan inhriat a tul tak meuh meuh a ni.

Lamtawi hmante:

C.P.C.S.E.A. - Committee for the Purpose of Control and Supervision on Experiments on Animals
USFDA- United States Food and Drug Administration
G.L.P.- Good Laboratory Practice
G.C.P. - Good Clinical Practice

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CELEBRATION OF NATIONAL PHARMACY WEEK AND SOME RELATED HEALTH CARE ISSUES

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The Indian Pharmaceutical Association (IPA) is the national body of Pharmacy Professionals and was founded in 1939 with the objective of advocating for promotion of the professional and ethical standards of Pharmacy. It focuses the image of Pharmacists as competent health care professionals; it sensitizes the common people, government and other related professionals on vital health care issues. This professional organization also suggests on all aspects of Drugs and Pharmaceuticals including Pharmacy Education in the country. IPA, with its Head Office in Mumbai, supports and carry out the professional activities through its divisions, namely-Industrial Pharmacy, Community Pharmacy, Hospital Pharmacy, Regulatory affairs, Education and Student division. IPA publishes its monthly professional communication 'Pharma Times', and professional research publication 'Indian Journal of Pharmaceutical Sciences' (IJPS).

Celebration of the National Pharmacy Week (NPW) started from 1961 after the decision taken in the Indian Pharmaceutical Congress (IPC) held at Puri and is being celebrated every year during the 3rd week of November. In such a celebration, a theme is selected on a vital health care issue and the role of pharmacy professionals in the undertaken health care programs. During the NPW celebration, public meetings, professional workshops and interactions, seminars on professional issues, public displays, distribution of leaflets, professional exhibitions, academic and sports competitions among students, media coverage programs such as publication of write ups in Newspapers and Magazines, Press release, Press conferences, TV and Radio interviews and discussions etc. are arranged by the Pharmacy professionals and professional students. During the celebration, pharmacy professionals also write letters, make representations, submit memorandum to the government on health and professional issues. The themes of NPW celebration from the year 2000 onwards are given in Table-1

Table 1: NPW theme from the year 2000 onwards

Year	Theme
2000	Pharmacists: Sharing responsibility in fighting AIDS
2001	Pharmacists in Health care: Councelling for women's Welfare
2002	Improving access to Medicine through Pharmacists
2003	Pharmacists for promotion of future free of Tobacco
2004	Know your Pharmacist
2005	Know your Pharmacist
2006	Self Medication: How safe? Ask your Pharmacist
2007	Know your Pharmacist: For safe use medicines
2008	Ask Your Pharmacist: For Safe Use of Prescription Medicines
2009	MAKE PHARMACY YOUR CAREER

A Pharmacist is a professionally qualified professional engaged in activities such as design, development, manufacture, distribution, preservation, sale, clinical study, drug information source, dispensing of medicines, community service, regulatory control of manufacturing and marketing of drugs and pharmaceuticals.

The conventional professional education of Pharmacy in our country is of 3-tier system: Diploma (2 years course of Diploma in Pharmacy), Graduation (4 years B. Pharm. Course) and Post Graduation (2 years M. Pharm. Course). Research Degree (Ph.D.) and research and development work in this area (R & D work in Drugs and Pharmaceuticals) is the next professional activity after formal professional education for those who opt for such professional studies. Pharmacy education is a technical education controlled and regulated by the Pharmacy Council of India (PCI) and the All India Council for Technical Education (AICTE). Recently, a new course named as Pharm. D. (Doctorate in Pharmacy) with a course duration of six years (5+1) after 10+2 in science stream has been introduced (Gazette of India, May 2009).

WHO states "Effective medicine can be practiced only where there is effective drug management. …only when the Pharmacist has been accepted as a vital member of the health care team, the necessary supporting services can be organized with the professionalism that they demand". WHO report on "The role of Pharmacists in the health care team" states that the competence of the Pharmacists is already proven and evident in the direction and administration of pharmaceutical services, in drug regulation and control, and in the formulation and quality control of pharmaceutical products. Unfortunately in India, the role of pharmacists in the health care team has been kept at quite a marginal status because of lack of understanding its role.

Pharmaceutical industries in India have made a spectacular progress in the last couple of decades and has captured a respectable position in the world in terms of pharmaceutical products by volume and value, number of manufacturers and formulations, number of bulk drugs production, and in terms of growth rate in both formulation market and bulk drug market. This sector of pharmaceutical area now possesses adequate strength in analytical and formulation development, state of the art manufacturing facilities with international regulatory approvals. Many Indian companies now spend considerable amount of money in R & D work and their contribution is globally felt in the area of new drug development.

The health care status and facilities in India is improving very fast during the last two decades. The continuous effort made in the national level in association with international health care programs in the form of Govt. Schemes are the positive factors in controlling the burden of diseases in the country. However, the country is still behind the targeted achievement. High population, low literacy rate, low living standard and considerably lower income might be negative factors in achieving the targeted goal.

Table-2 shows some statistics on India published by WHO that are related to the public health.

Table-2: General Statistics on India published by WHO in 2008
(Figures are for 2006 unless indicated)

Total population	: 1,151,751,000
Gross national income per capita (International $)	: 2,460
Life expectancy at birth, m/f (years)	: 62/64
Healthy life expectancy at birth, m/f (years, 2003)	: 53/54
Probability of dying under five (per 1000 live births)	: 76
Probability of dying between 15 and 60 years, m/f (per 1000 population)	: 276/203
Total expenditure on health per capita (Intl $, 2006)	: 109
Total expenditure on health as % of GDP (2006)	: 4.9

The causes of deaths in Indian population are to be taken into account in such health care programs to achieve the desired health care status. Statistics published by the WHO given in Table-3 and Table-4 indicate the necessity of taking preventive measures in these specific health care problems.

Table-3: Causes of death in children under 5 years of age , (India, 2002-2003)

Causes	Deaths (%)
Total neonatal deaths	100
Neonatal causes	45
HIV/AIDS	1
Diarrhoeal diseases	20
Measles	4
Malaria	1
Pneumonea	19
Injuries	2
Others	9

Table-4: Top ten causes of death, all ages , (India, 2002-2003)

Causes	Deaths (%)
All causes	100
Ischaemic heart disease	15
Lower respiratory infection	11
Cerebrovascular disease	7
Perinatal conditions	7
Chronic obstructive pulmonary disease	5
Diarrhoeal diseases	4
Tuberculosis	4
HIV/AIDS	3
Road traffic accidents	2
Self-inflicted injuries	2

Pharmacists play an important role in any health care program, because the wide span of activities that comes under the Drugs and Pharmaceuticals are carried out by pharmacists only. However, a notable fact is that the pharmacists are not given adequate representation in the Local, State or Central Govt. organizations while preparing any health care scheme to reduce or to fight against the disease burden. While asking for more responsibility and proper status in such health care planning and program execution, at the same time pharmacists should also be able to deliver the required standard of service with the highest professional ethical standard. The first and most important point to be considered is the standard of Pharmaceutical Education, as this is the foundation for producing the required professionals to deliver the services in the professional area.

Let us make a serious move in all the professional service areas to achieve the current target so that we, the present pharmacy professionals cannot be blamed by the future pharmacy professionals for not having a respectable high standard to start their professional activities.

COSMETICS CHUNGCHANG

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Damdawi (Drugs) leh pangti cheina hmanrua (Cosmetics) te hi an inlaichin hnai khawp mai a. Cosmetics kan hmanna tam tak hi natna (disease)-ah a nih avangin fimkhur a ngai a, kan hriselna thlenga nghawng thei thil tam tak Cosmetics kan tihah hian a inphum tel avangin India ramah pawh a khuahkhirhna dan inang, Drugs & Cosmetics Act kan hmang reng a ni. He Dan hi Drugs Inspectors-te leh Drugs Control lama kan hotuten an kengkawh tur a ni a, a nihna tur ang tak hian Mizoramah kan hmang em tih chu ka hre chiang hauh lo va. Cosmetics tam tak hian kan hriselna a nghawng miau avangin he lam ngaihtuahtu tan chuan vei loh a har khawp mai. Kan hmel leh vun, kan taksa mawi lohna leh harsatna kan tawh hrang hrangte kan han sawi hian Cosmetics mai aia ril zawk hmanga inenkawl ngai kan nih hmel thin khawp mai. Lu phut, arngeng, hmaibawl, vun ro, sam tla leh a dangte hian kan taksa chu a tilang mawi lo khawp mai a. Heng zawng zawng rawn lan chhuahna hi taksa hnathawh dik tawk lo leh natna vang a ni. Cosmetics hmang chauhva inenkawl a dik ber lo fo. Cosmetics lama thiamna neite pawhin fimkhur takin min pantute kan en a ngai a ni. He lama thiamna tak tak nei hi Mizo zingah hian kan la awm lo a ni mai thei e.

Eng nge Cosmetics?

Cosmetics hi Greek tawng 'Kosmeticos' tih atanga lak a ni a, 'incheina/mawina (to adorn)' tihna lam hawi a ni. Taksa cheimawina, mi dang hip thei tura kan inbel mawina leh inkah rimtui te hi a huam vek a ni. Hetianga taksa a nihna mai piah lama a lan mawi leh zualna tura inthuam kan chinna hi a rei tawh hle. Lal Isua pian hma, Pharoa hun lai atang tawh khan Aigupta mite chuan an lo ching tawh a, Mizote pawhin kan theih ang tawk chuan inbelmawina lam chu kan lo buaipui ve tho va. Vakiria te, thi chi hrang hrang te pawh kan nei ve bawk awm e.

Mihringten nasa takin hma kan sawn a. Cosmetics lama kan hriatna pawh a than chhoh zel laiin kan hriselna khawih thei thil tam tak a lo chhuak ta a. He lama hmasawnna rah chhuahte hi hmeichhiaten a hlawkna an tel ber a. An hmel leh taksa lan dan, an rim thlenga tihdanglam theih a lo ni ta a. Mi dang hip thei tura an inthuamna chuan a chim chin a rawn pel ta a ni ang, kum 1770 khan British Parliament chuan Dan a lo pass ta a. A Sap tawngin an dan siam chu hetiang hian ziah a ni:

"That all women of whatever age, rank, profession or degree whether virgins, maids or widows that shall from and after such Act impose upon, seduce and betray into matrimony any of His Majesty's subjects by scents, paints, cosmetics, washes, artificial teeth, false hairs, Spanish wool, iron stays, hoops, high heeled shoes, bolstered hips, shall incur the penalty of law in force against witchcraft and like misdemeanours and that such marriage upon conviction shall stand null and void."

Chu chu a Mizo tawng chuan "Nula, nula thianghlim emaw, nuthlawi emaw pawh ni se, an rim emaw, an incheina bungraw hrang hrang hmanga kan Lalber khua leh tui tu pawh a lo chhai thluk a, run hmun leng dun tura 'Tiam tlat e' a lo tihpui tih hmuhchhuah a nih chuan dawithiam anga ngaih a, dawi lam ti mite nen hremna thuhmun an chungah lek tur a ni ang. Tin, an inneihna pawh inneihna puitling anga ngaih tur a ni hek lo vang."

He thu kan en hi chuan khatih hun laia an dinhmun kha a ngaihruat theih awm e. An practise nasa hle ni ngei tur a ni. An zing tho hmel leh an khawlai leng hmel a inthlau ve a ni ngei ang – an pasalten bum nia inhriatna an lo neih tak ni.

Drugs nge Cosmetics?

Taksa mawina hi hriselna nen a inkungkaih tlat a, chutiang bawkin kan mawi lohna pawh hriselna nen a inkungkaih tlat a ni. Kan lan mawina leh mi dang kan hipna atan chuan kan vun hi a pawimawh ber mai a, kan personality-te hi chu thu hranah lo dah ta ila. Vun mam tha tak, no chek mai nei thei tur chuan kan taksa a hrisel a ngai a, kan ei leh in te leh kan taksa khawl te hnathawh pawhin thui tak a hril a ni. Incheina leh inhnawih atana kan hman tam tak hian kan hriselna a khawih chhiat theih avangin Cosmetics kan hman kawngah kan fimkhur a ngai hle. Hei hi mi thiamten an hriat chian avangin khuahkhirh a tul tih an hria a, chuvangin a khuahkhirna dan mumal tak neih a lo ni ta a, India ramah chuan Drugs & Cosmetics Act tih a ni. Cosmetics chuan kan taksa hnathawh a tibuai tur a ni lo va, taksa tihfaina emaw, incheina tur atan liau liaua hman tur a ni. Kan taksa hnathawh tidanglam a, natna tihdamna tur atana kan hman reng reng chu Drugs a ni. Cosmetics-a kan hman tam takah hian Drugs a tel a, Over the Counter drugs zinga chhiar tel an ni.

Entirnan, shampoo chu cosmetics a ni a, antidandruff shampoo erawh chu drugs zingah chhiar tel a ni. Inkah rimtuina, body deodorant chu cosmetics a nih laiin, zakkha neite hman thin antiperspirant (thlan chhuak tam lutuk vengtu) chu drugs

a ni. Luphut shampoo chu kan lu-a fungus kan tihin kan vun a ei vanga awm emaw hrik dang vang emawa lo awm a ni a, chutiang thahna tur atana siam a ni. Kan vunah hian thlan siamtu gland, sweat gland an tih a awm a, chu chu antiperspirant-ten a hnathawh an zuk tihdanglam vang emawin thlan insiam tur a tlem phah thei. Hengte hian kan taksa hnathawh an tidanglam a, drugs an ni. Mahse OTC drugs, doctor-te chawh kher ngai lo damdawi zingah telh an ni. Hetiang bawk hian arngenga hnawih chi te, astringent (vuna proteins awm tidanglamtu) te, sunscreen te pawh hi an ni bawk.

Cosmetics Industry

Cosmetics hralh tur hian licence neih kher a ngai lo va, a siamna nei tur erawh chuan licence mumal tak neih a ngai thung. Pharmacist-te enpuina hnuaiah a siamna hi din a ni thin. India ramah hian March 31, 1999 thleng khan ram dang atanga cosmetics lakluh hi khuahkhirh a ni a, Restricted Import list-ah dah a ni. Kum 1999 hnu lamah erawh kha chuan restriction hlih a nih tak avangin licence mumal neih chuan ram dang siam pawh lakluh theih a ni ta. Kum tin 15% vela thang angin India rama Cosmetics Industry-te hi chhut a ni. Ram pum anga chhut chuan cosmetics-ah hian kan la inseng nasa lo hle a, India rama mi pakhatin cosmetics atana a sum sen (per capita expenditure) hi Rs 30 vel chauh nia chhut a ni. India rama Cosmetics Industry hlut zawng hi Rs 4,300 crores vel nia chhut a ni.

Cosmetics Industry-tena an zawm tur standard hi Bureau of Indian Standard, BIS (ISI kan tih thin) hian a siam a. A siamna hmun vawn leh hmanrua neih ngei ngei tur te, test tih ngei ngei tur te hi Drugs & Cosmetics Act-a Schedule M-II-ah ziah lan a ni. Inspection leh licence pek chhuah hi Drugs Control-te tih tur a nih angin a endik leh a him leh him loh lam endik hi an kuta awm a ni.

Cosmetics hman kawnga fimkhur

Cosmetics kan hmanna tam tak hi natna avanga lo awm a ni a. Luphut, hmaibawl, zakkha, sam tla leh a dangte hi a lanchhuahna mai piah lamah hian taksa hnathawh dik lo leh natna hrik tena min ei vanga lo awm a ni a. Hetiang enkawl kawngah hian kan fimkhur a pawimawh. Mihring hi kan inang vek lo va, Siamtuin kan vunte hi ral veng tura a dah a nih avangin thil tam takah an sensitive em em mai a. Cosmetics tam tak hi kan vun tichhe thei leh kan vunin a huat (allergic) an ni thei a, chuvangin heng cosmetics-in a ken (content)-te hrechiangtu ngei kan rawn fo hi a him. Tin, dam hun chhung (expiry date) nei an nih pawh hi kan hriat a tha awm e.

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A PIONEEER, ARCHITECT OF INDIAN PHARMACEUTICAL EDUCATION

Dr. B.B. Bhattacharjee
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While and whenever I look back on my past days, obviously few images appear in my mind's vision, of whose kind support made me what I am at present. Out of these images the most prominent face I can recal is the image of Prof. M.L. Schorff, the doyen of Pharmaceutical Education in India. Fortunately, I happened to be his student while he was serving as Head of the Department of Pharmacy at Jadavpur University in 1964, though his earthly body no longer exist, he had departed on 25th August, 1971 even then he remains in association with me, I feel him through my professional activities which have been reflected by his teachings.

Therefore, I felt it is utmost necessary to write in short about his multifarious activities, achievements, life and works for the people of this region. Much less had been enlightened about him, and his professional thoughts and works.

This write-up is to show my humble gratitude to my mentor, teacher, guide and philosopher, and I dedicate it to my fellow pharmacists and to the would be pharmacists of this region.

I took many information, chronological data, etc. about Prof. M.L. Schroff mostly from the writings of Prof. A.P. Hardas and Prof. Harkisen Singh, and from some other scattered spontaneous writings.

About Prof M.L. Schroff

Name : Prof. (late) M.L. Schroff.

Date of Birth : 6th March,1902

Birth place : Darbhanga, a small township in Bihar State.

Education

Schooling : At Bhagalpur.

After School : Did his intermediate at Bhagalpur in the year 1920. Thereafter, joined Engineering College at Benaras Hindu University in the same year.

Activities at Benaras Hindu University : Prof. M.L. Schroff was inspired by the call of Mahatma Gandhi and Swamy Satya Deo at B.H. University in 1921, he raised voice against the then principal Mr. Charles A. King of the engineering college. As a result of this he had to leave the B.H. University in 1921.

Other Activities : Prof. M.L. Schroff left India for China, from China he went to Japan and there he spent 15 months. During his stay in Japan he was associated with a newspaper and collected an amount from this new assignment. Thereafter, he left Japan for America to pursue higher studies.

Education in America: In the year 1922, he joined Bachelor of Science at a Chemical Engineering College in Iowa, America. At that time he was awarded a scholarship by the college authority. After few months he left the Institution and obtained degree in Arts with honours in Chemistry in the year 1925. He obtained his Master in Chemistry and Microbiology from Massachusetts Institute of Technology (MIT) in 1927.

Return from Aboard: Prof. M.L. Schroff returned from America in the year 1929.

Activities in India: In 1929, joined Birla Brothers Ltd. in Calcutta. He was not satisfied on seeing the attitude of the people, he was much shocked.

At that time, he met a prominent industrialist and patriotic personality Sri Jamunalal Bajaj, who transformed him. With the recommendation of Sri Jamunalal Bajaj he was introduced to the then Vice Chancellor of Benaras Hindu University, Pandit Madan Mohan Malviya, who recognized the spirit that lay asleep in him for education of his countrymen. Pt. M.M. Malviya invited him to join Benaras Hindu University.

In 1932, at B.H. University, Prof M.L. Schroff with his Chemical and Microbiological Technology started a separate section with co-operation and patronage by the Vice-Chancellor Pt. M.M. Malviya and named that separate section as Pharmaceutical Sciences.

Pt. M.M. Malviya realised the importance of this newly introduced curricula and asked Prof. M.L. Schroff to introduce the subject Pharmaceutical Chemistry in the B.Sc. syllabus in 1932.

In the year 1934, an integrated two year B.Sc. course with Pharmaceutical Chemistry, Pharmacy and Pharmacognosy

was introduced at B.H. University. This had been transformed to three year B.Pharm. course in 1937. This had been regarded as the first Pharmacy Educational Curriculum in India.

Prof. M.L. Schroff was regarded after the launch of B.Pharm. at B.H.University as "Father of Pharmacy Education In India".

Other Professional activities: In the year 1939, the Unite Provinces (former name) Pharmaceutical Association was transformed to Indian Pharmaceutical Association by him and organized its branches to all over India. The said organization had started to published a journal which was founded and edited by him, presently that journal is known as Indian Journal of Pharmaceutical Sciences (I.J.P.S.).

In 1940, Prof. M.L. Schroff started M.Pharm. course at B.H. University and the first M.Pharm of our country was Prof. G.P. Srivastava.

In 1943, he left B.H. University and joined Birla Laboratories Ltd. in Calcutta as Chief Chemist and research officer.

During the period, from 1940 to 1950 his technical expertise in the field of Pharmacy was utilized by the Govt. of India in the capacity of a member of Scientific and Governmental bodies, which includes Drug Technical Advisory Board (DTAB), Indian Pharmacopoeial Committee, Health Panel of Planning Commission etc. He was elected as President of Bengal Pharmaceutical association in 1946 and in 1948 he formed the Indian Pharmaceutical Congress Association (I.P.C.A) which till date exists with its voluminous and professional activities.

Prof. M.L. Schroff was elected the first Vice-President of Pharmacy Council Of India (PCI) in 1949, and first elected as President of Pharmacy Council of India in 1954. He continued as President for a period of five years from 1954 to 1959.

In 1959, Prof. M.L. Schroff organized the Pharmacy Department at University of Saugar (presently known as Dr. Harisingh Gaur Viswavidyalaya), Madhya Pradesh. There he served as Head of the Department, and later on organised and introduced courses like Diploma-in-pharmacy, B.Pharm., B.Pharm (Hons.), and B.Sc. with Pharmacology, Microbiology and Biochemistry.

In 1964, Prof. M.L. Schroff was invited by Dr. Triguna Sen, Rector of Jadavpur University, Calcutta (who became the Union Minister later on) to organise Pharmacy at Jadavpur University. He organised B.Pharm and continued his Service as Head of Department for a period of four years.

He founded the Association of Pharmaceutical Teachers of India in 1966, and he was elected first President this organisation. Under his guidance and editorship he started to publish one journal related to Pharmacy education and circulated in the name Journal of Pharmaceutical Education, which he nurtured end edited till his death. An era of Professional struggle ended in 25th August, 1971 in Calcutta.

Prof. M.L. Schroff, a soul fully dedicated for the upliftment of the profession of pharmacy, felt that there should be good books on Pharmaceutical Technology. He wrote many books viz: Biological Pharmacy (vol-I), Biological Pharmacy (vol-II), Pharmaceutical Calculations and Latin, Semimicro Analysis, Professional Pharmacy, and History of Indian Pharmacy are some of the books of professional interest. He also edited one journal in Hindi "Bhaishaj Patrika". The book "History of Indian Pharmacy" is a classic treatise unfolded various aspects in relation to practice of pharmacy which embraced ancient and medieval India, which has relevance in today's modern pharmacy in our country.

Besides these he was associated with numerous organisations and rendered his service for the betterment of Pharmacy Profession, his service and contributions in the field of Pharmacy Education was appreciated by the intellectuals, eminent scientists, and pharmaceutical industralists of the country. The respect, love, and affection is due to his eagerness to learn, perseverance to acquire and acquainted the true knowledge, his analytical capability towards the needs of the society with modern out-look and present needs.

Department of Pharmacy, Jadavpur University, Kolkata, has earned fame in Pharmaceutical Technology throughout the globe and that was his dream. Head of the Department of Pharmacy, Jadavpur University was his last assignment in the field of Pharmacy Education in India.

During our student time, many a times we were rebuked for our fault. A very common dialogue of his that we still remember is :- "You cannot walk with borrowed leg". This means, the knowledge should be acquired and that yours own, which would make you competent in solving out problems.

It is a blessings of God to me to be a student of such eminent educationist and I oblige whole heartedly that Prof. M.L. Schroff was my mentor for my Pharmaceutical Thoughts.

BIBLE-A KAN HMUH RAMHMUL DAMDAWI (BIBLICAL HERBS) CHI HRANG HRANGTE

T.L. Rualawia
D.Pharm, BD, Head Pharmacist, Sairang PHC

Bible (Pathian lehkhabu thianghlim)-ah hian mihring nunna atan Pathianin ramhmul damdawi chi hrang hrang sawi lan a nei nual a. Mithiamten research an beihna atangin an la hmuhchhuah belh zel bawk a. Sermon patê thlak khawmuang lovin lo sawi tan mai ila.

1. ALOE (Aloevera) (Johana 19:39,40)

Local TV-ahte a thatzia fakna kan hmu chiai chuai thin awm e. Hei hi kàng leh vun enkawl nan an hmang nasa hle a, pumpui leh rîl natna chi hrang hrangah an hmang bawk. Pán damdawi (open sores), arngeng damdawiah te an hmang bawk. Tin, a hnah hring hi vun pilh, pán hnai la, hahni puam leh hliamah te a tha hle.

2. CORIANDER (Theihmuvar) (Exodus 16:31)

Indigestion, Neuralgia, ruh leh tha-na, ha-na enkawlna hmanrua atan an hmang thin. He ramhmul (herbs) atang hian mihring tana tangkai tak mai, saturat chemicals possessing antibacterial properties puitu chi 20 hmuhchhuah a ni. Tin, rîl leh pumpui tha lo leh zunkawng tha lo-ah te pawh an hmang bawk thin.

3. CUMIN (Zira) (Isaia 28:25-27)

Antioxidant properties a pai a. Thuthlung hlui hun lai atang tawhin an hmang tangkai em em thin a ni. Lungphu tha lo (arrhythmia), thawhah, vun natna leh mipat hmeichhiatna lama chak lo enkawlna damdawi atan an hmang bawk.

4. MOHURI (Rùnhmui) (Matthaia 23:23)

Hmanlai Greek leh Rom hoten an ching uar em em a, cancer enkawlna damdawi atan leh estrogen deficiency, pumpui leh rîla gas tam lutuk enkawl nan an hmang thin a ni. A hriak chu bacteria chi hrang hrang tihhlum nan an hmang a, chaw kawng, rîlpui leh pumpui, rîlfang leh zun kawng na damdawiah te an hmang tangkai hle thin. Tin, phytochemical a pai a, chumi chu insecticide atan te leh uterine relaxant-ah te an hmang bawk thin.

5. HENNA (Jeremia 17:6)

Hnimbuk chi khat, hnah dip tak a ni. Aigupta hmeichhiaten an tin leh an sam te chei nan an lo hmang tawh thin a. Tunlai cosmetics dawra sam henna nana an hman thin hming lo irhchhuahna bul pawh a ni maithei awm mang e. Cosmetics atan leh rawng chi hrang hrang siam nan an hmang thin a; tin, Henna hi fungal infection of the nail (tin-aihni)-ah te, bacterial cidal-ah te leh fungicide damdawi chi-ah an hmang bawk.

6. HUSOP (Pudina chi khat) (Hebrai 9:19; Exodus 12:22)

Hnim chi khat a ni a, pudina family-a mi a ni. Chawhmeh tihrimtui nan an hmang thin a, pum pai nuam lo damdawi atan a tha hle. Tin, in chhung tihthianghlim nan te, thisen chhuak tihreh nan te, hmui/hnar tuamna tihrimtui nan te an hmang a; na chhawkna leh hritlang damdawi atan te pawh an hmang bawk thin.

7. MINT (Pudina) (Matthaia 23:23; Luka 11:42)

Hmanlai Judate chuan Kalhlen Kût ruai tihrimtui nan an hmang thin a, Synagogues chhuat tihrimtui nante an hmang bawk thin. Spices of mint thenkhatte chu thluak natna chi hrang hrang (Alzheimer's diseases) enkawl nan an hmang bawk. Ka chhung tihrimtui nan te, hahni enkawl nan te, tooth-paste leh liquor tihtuihnai nan te an hmang thin. Heng bakah hian pumpui chak lo leh thluak tihharhfim nan an hmang bawk thin a ni.

8. MURRH (Murra) (Estheri 2:12; Matthaia 2:12; Exodus 30:23)

Murra thing chi khat a ni. Thuthlung hlui leh Thuthlung thar hun laiin an hmang tangkai hle. Mesopotamia (Babulon ram), Greece leh Rome awp ram bial thenkhat chhungah chuan tinreng damdawi atan an hmang hial thin. Bronchial leh Viginal infections-ah te an hmang uar hle. Murrh atang hian mouthwash te pawh an siam bawk.

9. SAFFRON (Hla thlankhawm 4:14)

Judate khawvela spices man to berte zinga mi a ni. Sweet perfume atan leh colouring agent atan an hmang thin a, thuamhnaw leh kuttin chei nan an hmang nasa hle. Saffron hi damdawi lam thiamte chuan gastric leh intestinal problem damdawi siam nan an hmang thin. Tin, a dose hniam leh zualin antispasmodic, expectorant, sadative leh stimulants atan an hmang bawk. Tin, Saffron atang hian kal, phìng leh thin enkawlna damdawi siam nan an hmang bawk.

10. SPIKENARD (Hla thlankhawm 1:12; Marka 14:3)

Thing rimtui tak, zosanga awm chi a ni a, Lal Isua ke-a luanna hriak rimtui tak siam chhuahna thing ngei mai kha a ni. He thing zunga chemical substance atang hian damdawi tha tak tak, epilepsy, hysteria, heart palpitations leh cholera enkawlna an siam chhuak a. A hriak atangin auricular flutter damdawi te, ruh leh tihrawl zùtna damdawi tha tak siam nan an hmang bawk.

11. SANDALWOOD (Thingrai) (I Lalte 10:11)

He thing atang hian cosmetics man to tak tak te, vun tihmamna damdawi te, mut tuina damdawi siam nan te an hmang thin a. Tin, urinary tract infections (zun kawng natna) na chhawkna damdawi siam nan an hmang bawk.

12. CINNAMON (Thakthing) (Thufingte 7:17; Exodus 30:22-25)

Thuthlung hlui hun laiah chuan hmuihmer leh thil dang bawlhlo atan an hmang thin, tunlai thleng pawha hman lar a ni. Cinnamon hi hangêt leh zunthlum ven nante an hmang thin. Amaherawhchu germicide atana a bika siam erawh chu a hlauhawm hle a, kal a tichhe thei a ni.

Heng bakah hian Bible atanga kan hmuh ramhmul damdawi tangkai tak tak a la awm nual a, chungte chu an hming chauh han tarlang ila:

1) Black Cumin (Zira) (Isaia 28:25-27)
2) Black Mustard (Antam) (Matthaia 13:31)
3) Cassia (Exodus 30:24)
4) Fenugreek (Purun hel ei chi) (Numbers 11:5)
5) Frankincense (Beraw) (Isaia 60:6)
6) Garlic (Purunvar) (Numbers 11:6)
7) Garbanum (Beraw eng chi) (Exodus 30:34)
8) Juniper (Thlaler thing) (Lalte 19:4; II Chronicles 2:8)
9) Milk Thistle (Lenhling) (Joba 31:40)
10) Nettle (Kangthai) (Thufingte 24:31)
11) Rose (Isaia 35:1)

TARGETED DRUG DELIVERY

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The concept of targeted drugs is not new, but dates back to1906 when Ehrlich first postulated the "magic bullet". The durability of this concept is a strong indication of its appeal, but the "magic bullet" continues to be a challenge to implement in the clinic. The challenge has been on three fronts

(a) finding the proper target for a particular disease state
(b) finding the drug that effectively treat this disease and
(c) finding a means of carrying the drug in a stable form to specific sites while avoiding the immunogenic and non-specific interactions that effectively clear foreign materials from the body.

Nanoparticles are potentially useful as carriers of active drugs and, when coupled with targeting ligands, may fulfill many attributes of a "magic bullet". Nanoparticles are polymeric particles made of natural or artificial polymers ranging in size between 10 to 1000 nm (1μm). The drug is dissolved, entrapped, encapsulated or attached to a nanoparticle matrix and depending upon the method of preparation, nanoparticles, nanospheres or nanocapsules can be obtained.

Nanoparticles encompass a variety of submicron (<1μm) colloidal nanosystems, which may be inorganic, liposome-based or polymer-based. Nanoparticles drug delivery systems have been studied for several decades now, and many of the features that make them attractive drug carriers are well-known. One the major advantage of nanoparticles is their small size, which allows them to pass through certain biological barriers. A second advantage is that a high density of therapeutic agent can often be encapsulated; which-depending on the preparation process- can be engineered to

yield different properties and release characteristics for the entrapped agent. Because of the versatility of chemistries and preparation methods in these systems, surface functionalities can sometimes be incorporated into the nanoparticle. This facilitates additional attractive properties, such as attachment of "shielding" ligands that prolong the circulation of the nanoparticles in the blood stream, or the targeting of ligands for interaction with specific cells of tissue.

Compared with other colloidal carriers, polymeric nanoparticles present a higher stability when in contact with biological fluids. Also, by varying the polymer composition of the particle and morphology, the desired properties such as controlled and sustained drug release can be obtained. There has been a variety of materials used to engineer solid nanoparticles both with and without surface functionality. Perhaps the most widely used are the alipathic polyesters, specifically the hydrophobic poly (lactic acid) (PLA), the more hydrophilic poly (glycolic acid) (PGA) and their copolymers, poly(lactide-co-glycolide) (PLGA).

Ligand coupled nanoparticle features

i) Size and cellular uptake

The submicron size of nanoparticles offer distinct advantages over larger systems. First, the small size enables them to extravasate through blood vessels and tissue. This is especially important for tumor vessels, which are often dilated and fenestrated with an average pore size of less than a micron compared with normal tissue. Second, solid nanoparticles made from biodegradable polymers and encapsulated drug are ideal for sustained intracellular drug delivery, especially for drugs whose targets are cytoplasmic.

iii) Bypassing multidrug resistance

Nanoparticles also appear to be a useful approach for overcoming certain kinds of drug resistance. Some tumor cells able to expel intracellular drugs into the external medium, thereby attaining resistance from drug action. This mechanism called, multidrug resistance, is related to the over expression of the adenosine triphosphate (ATP)- binding cassette family of transporters, which include p-glycoprotein (p-gp) transporter and the multidrug resistance protein (MDRP) family. These transporters are trans-membrane proteins capable of pumping out many anticancer drugs that diffuse into the plasma membrane. Because these transporters recognize drug in the plasma membrane, internalized particles bypass this mechanism and are able to release drug within the cytoplasm or endosomal vesicles, thereby increasing the effectiveness of the drug.

In one study, it was shown that p-gp efflux affected the uptake of free doxorubicin compared to the uptake of folate-targeted liposomal doxorubicin in an MDR cell line. In another study, it was also demonstrated that doxorubicin-cynoacrylate nanoparticles were always more cytotoxic than free drug in rat glioblastoma cells. Thus, it appears that the packaging of drug delivery into the cell by way of endocytosis of nanoscopic materials may circumvent p-gp mediated MDR, abrogating the need for co- administration of p-gp inhibitory agents.

iv) Synergistic effects between target ligand and encapsulated drug

Certain monoclonal antibodies when combined with a drug, can prove to be more beneficial than the drug alone or antibody alone in inhibiting the proliferation of cancer cells.

Synergistic or additive therapeutic effects can occur with simultaneous presentation of antibody and drug to target cells; this can be translated into a single unit when nanoparticles encapsulating drug are also surface modified to present a synergistic ligand.

Methods for coupling targeting ligands to nanoparticles

Targeting ligands include any molecule that recognizes and binds to target antigen or receptors over expressed or selectively expressed by particular cells or tissue components. These may include antibodies or their fragments, peptides, glycoprotein, carbohydrates or synthetic polymer.

The most widely used coupling group is PEG, because this group creates a hydrophilic surface that facilitates long circulation of the nanoparticles without being recognized by the macrophages of the reticuloendothelial system (RES). This strategy has been used successfully in making "shealth" liposomes with affinity towards target cells. The incorporation of ligand into liposomes is easily achieved by conjugation to the phospholipids head group. The strategy relies either on pre-insertion of the functionalized lipid or post-insertion into a formed liposome. Functionality could also be introduced by incorporating PEG with functional end-groups for coupling to target ligands.

The situation is slightly more complicated with solid nanoparticles. The strategy involves the formulation of target-drug conjugates into nanoparticles; an example is the US Food and Drug Administration (FDA)- approved albumin -paclitaxel nanoparticles system (Araxane) used for treatment of advanced breast cancer.

Targeting modalities

i) In vivo passive targeting

One the most promising application for targeted drug delivery using nanoparticles is in local application using interventional procedures such as catheters. Potential applications have focused on intra- arterial drug delivery to localize therapeutic agents in the arterial wall to inhibit restenosis. Drug loaded nanoparticles are delivered to the arterial lumen via catheters and retained by virtue of their size, or they may be actively targeted to the arterial wall by nano-specific interactions such as charged particles or particles that target the extracellular matrix.

Passive delivery may also be targeted to tumors. Aggressive tumors inherently develop leaky vasculature with 100-800 nm pores due to rapid formation of vessels that must serve the fast growing tumor. This defect in vasculature coupled with poor lymphatic drainage serves to enhance the permeation and retention of nanoparticles within the tumor region.

Passive delivery may also be directed to lymphoid organs of the mammalian immune system, such as lymphatic vessels and spleen. These organs are finely structured and specialized in eliminating invaders that have gained entry to tissue fluids. Nanoparticles may easily penetrate into lymphatic vessels, taking advantage of the thin walls and fenestrated architecture of lymphatic microvessels. Passive targeting to the spleen is via a process of filtration. Indeed, the spleen filters the blood of foreign particles larger than 200 nm. This function facilitates splenic targeting with nanoparticles encapsulating drug for effective treatments against several haematological diseases.

ii) Targeting by route of administration

The selection of the route of administration for nanoparticles can be critical for successful targeting. One important distinction is the direct administration to a physically local region of tissue versus indirect delivery via the systemic circulation. Other important routes of delivery include transdermal delivery and pulmonary delivery of aerosolized nanoparticles. Ocular delivery of drug-loaded, sustained release nanoparticles by intravitreal administration is a promising route for eye disease, because it eliminates the used for multiple injection of drug.

iii) In vivo active targeting into the eye.

Target ligands attached to the surface of nanoparticles may act as "homing devices", improving the selective delivery of drug to specific tissue and cells. This is especially true for targets that are readily accessible from the vasculature (e.g.) circu-

lating malignant cells in hematological malignancies such as B-cell lymphoma and multiple myeloma.

Future directions:

The current focus in pharmaceuticals is shifting to a smart drug paradigm, in which increased efficacy and decreased toxicity are the motivating factors. This could be achieved with targeted nanoparticles where repertoires of targets and a series of drugs could yield new generations of highly specific therapeutic agents.

The most promising application of in vivo targeted nanoparticle drug delivery currently involves readily accessible targets in the vasculature, such as malignant immune system cells. A second promising application is in local attachment via interventional catheterization procedures to the vasculature or other tissues. For in-vivo targeting of other sites, the characteristics of the targeted organs or cells are important. When remote organs or cells (such as cells within solid tumors) are the targets, there is still a need to find ways to navigate nanoparticles through the labyrinth to the target site while avoiding clearance. Toward that goal, there have been reports of using hydrophilic coatings, such as PEG, poloxamers and polyamines, to achieve enhanced circulation time. Even with breakthroughs in the engineering of long circulating nanoparticles, there is still the additional challenge of understanding and achieving the dosing that delivers consistent pharmacokinetics.

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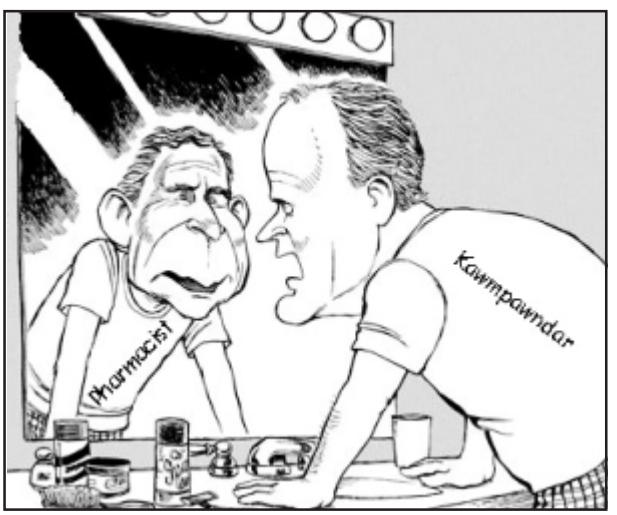
PHARMACIST VS COMPOUNDER

Lalvuana
B.Pharm, Civil Hospital, Aizawl

Mizoramah hian Pharmacist-te hian hriat kan hlawh lo ta hle mai a. Ram a changkang zel a, Pharmaceutical science lamah pawh kan ram, India pawhin khawvelah hian a hmasawn chakna ber ti ila kan sawi sual tam awm lo ve. Chutih laiin Mizoram bikah hian Pharmaceutical science lama mithiam kan la nei tlem hle mai a, kan hranghluiten Compounder hna thawkin kan ram khaw hrang hrang kilkhawr ber berah te, Medical Officer (Doctor) awm phak lohnaah damlo enkawl hna an lo thawk a, hmun thenkhatah phei chuan kan Doc- tor-te aia an rin zawk leh an innghahna an lo ni fo thin reng a.



Mizote hi damdawi thiam- na lamah hian kan la thleng sang lo hle a, kan mithiam pui puite hian Phar- macist thenkhat te, “Eng hna nge i thawh?” tia an zawh changa, “Pharmacist,” tia an insawi chang pawh hian, “Pharmacist-te chuan eng ber nge in thawh?” tih zawhna zawt ta chut chut te pawh kan pu te, Officer lian tak takte zingah an la awm tlat mai! Chutia kan pute hnena insawifiah nan, “Hmanlai chuan 'Compounder’ an tih thin kha,” tia insawifiah a ngai leh fo thin hi a buaithlak hle.

Aw le, Pharmacist tih hi han sawifiah dawn ila. Pharmacist tih chu damdawi siam, chawhpawlh, hman dan tur buatsaih thiam, chutiang ti tura phalna nei, ti ila kan sawifiah ber awm e. Tun hma chuan damdawi thenkhat hi siam chawp ngaite a nih avangin leh chemical compounding (damdawi chawhpawlh) ngai a nih hlawm avangin, licence an pek thin chu 'Compounde' an lo ti thin a, Certificate Course zirin an lo practise thin a. Hospital reng rengin anmahni hospital chhunga damlote enkawl nan Physician-te prescription chu tehna bik (Hospital formulary) neiin an damlote hnenah an pe chhuak thin a ni. Tunlaiah chuan khang kan pute (Compounder) kha dinhmun sang zawkah hlangkai zelin 'Pharmacist' ah an lo kaitir ta vek a, chungte chuan sawrkarah an hnate thawk a, lo chawlhsan (pension)-in min lo chhuahsan mek a. Anmahniin pharmacy-te siamin leh mi hnuaiah te thawkin an lo awm ta hlawm a, an thiamnate mipui tan an la hmang mek zel a ni.

Pharmacist chu 10+2 Science (Physics, Chemistry, Biology or Mathematics, 45% marks minimum hmu chin) tan Diploma in Pharmacy kum hnih leh thla thum aia tlem lo, Practical Training zo emaw, 10+2 Science (PCB/PCM passed emaw D.Pharm 50% marks with 5 yrs service) tan Bachelor in Pharmacy (B.Pharm) kum 4 leh Industrial Training (compulsory) zir zo, Pharmacy Council of India hnuaia Registered Pharmacist-te chu Pharmacist-ah te, Drugs Inspector-ah te leh Pharmacy Institution lamah Laboratory Technician, Demonstrator leh Lecturer tein an thawk mek a ni. Tunah phei chuan Ph.D in Pharmacy thlengin kan lo nei ve ta.

Tun hma chuan, damdawi siam sa (standard preparation) a la awm meuh loh avangin kan rual u-ten damlo hnenah damdawi hi Doctorte Prescription dungzuiin Compounder/Pharmacist-ten an dispense thin a, an tel lovin Doctor-ten damdawi chawh mah se, pek mai tur a awm thei lo a ni. Tunah erawh chuan damdawi siam sain Pharmaceutical Industries-a thawk Pharmacist-ten an rawn packed sa (standard preparation) hmangin Doctor-ten damlo prescription an siam a, chu chu Community Pharmacist-ten a enkawl hna te, a vawn dan tur dik taka vawngin, a nih tur ang leh thawh tur ang thawk ngei turin damlo hnenah an pe chhuak thin a ni. Hetah hian Dan (Drugs & Cosmetics Act, 1940 & Rules 1945)-in a sawi angin damdawi leh bawlhlo, kan hmelhmang timawi leh lan dan danga min siam thei te siamchhuak leh hralh/zuar tur hian Pharmacist ngei hmang tura a tih avangin, damdawi leh thil dang a kaihhnawihte hi Pharmacist-ten Section 42 of Pharmacy Act, 1948 hmangin an mawhphurhna a ni tih hriain he hna hi an thawk mek a ni. Hetianga prescription service bakah hian industry lamahte pawh thenkhatah Graduate in Pharmacy chin te phei chu Chemist hna te, Quality Manager te thawkin dinhmun pawimawh ber ber te chu Pharmacist-ten an chelh mek a ni.

Hetih laiin kan ramah hian ni tin damdawi mamawhtu an tam em em a. Thiamna a sang zel a, Pharmacist-te pawimawhna a zual zel a; dan ang lova miin thil a ti duh a nih loh chuan, Govt. supply semchhuah a ni emaw, Community service a nih pawhin Pharmacist tel lovin Drug Licence pek theih a ni lo hrim hrim tih pawh kan hre ve ta zel a. Heng avanga Pharma-

cist mamawhna pung zel avangin B.Pharm, zirin kan ramah ngei pawh kum tin sawm telin an Graduate zut zut ta! Institution lama mithiamte pawhin kan ram hnim leh thlai atanga siam theih damdawite an zirchiang (Research) mek bawk. Hetianga thiamna sang zawk an bawh a, an lo zir chhuah hian kan ram hmel pawh a danglam ve zel beisei ila. Pharmacist-te hian damdawi thar hmuhchhuah te, enkawl leh semchhuah te, Community Pharmacy hna vantlang mipuite tana thawh te, heng Pharmacy (Damdawi zawrhna) te hi dan ang thlapin him takin an thawk ngei tur a ni. Chu mai ni lovin, kan ramah ngei hian ramin a mamawh damdawi (eg. Inj. Quinine, etc.) hi reiloteah kan la siam chhuakin hmun dangah kan la thawn chhuak ngei dawn a ni.

Pharmacist profession hrim hrimah hian kan chian ngai em em pakhat leh chu, kan pian ve hma atang tawhin kan ramah hian damlotena an belh ber chu Compounder/Pharmacist-te kha an ni. Hmun thenkhatah phei chuan nau chhar hna te, minor operation, hliam thui, ruh tliak zawm leh ha phawi, injection te, kan Doctor-tena an tih theih zawng zawng chu an lo thawk ve thin a; a chhan chu Doctor indaih loh avangin hmun hla zawkah hma lo latute chu kan pute kha an ni tlat! Tunah hian an pawimawhna a awm ta lo em ni? Awm tehreng mai, Medical science-ah hma nasa taka kan sawn rualin Pharmaceutical science lamah pawh hma kan sawn tho si a, vawiinah hian keimahni vang nge, kan pute hian chhawr tlakah min ngai ta lo nge, kan inbihchian tlan a ngai hle mai.

Govt. hnuaia thawk Pharmacist-te leh thawk lote pawh hian tih tur chi hrang hrang kan nei theuh a, chung kan hna kalhmang chu kan puten min pek angin kan thawk tur a ni. Damdawi hi a nihna ang taka vawng thianghlim tur chuan Storage Condition fel taka nei an nih avangin hian rawtna ka'n siam chhin teh ang:

i) Damdawi hming fiah taka Stock Book-ah ziah luh tur a ni. Khawi atanga dawn nge, engtik nia dawn nge, Batch No, Date of Expiry, Quantity Received, etc.

ii) Damdawi chu a tui chi a nih chuan, ni sa em loh hrim hrim a him a, hmun hul leh ro-ah te, thil sa/lum lutukah dah loh hram ni se.

iii) Damdawi chu a tablet emaw capsules emaw powder chi a nih chuan a pack-na a phui tha tur a ni a, a strip leh packet te chu an ro thain an hnawng tur a ni lo va, transparent a nih pawhin ni-in a chhun tlang tur a ni lo.

iv) Khing damdawi reng rengte khi a dahna hmun hran theuhah dahin, an hmingte fiah taka ziakin, a theih hram chuan an Generic name-a ziah theih ni se, rack-ah tlar thatin label a, tar vek ni se. Mahni (Pharmacist) ngeiin rem that hmasak ni se, Drug Store-ah hian kan hmuh lai ngeiin kan thawhpuite hian an la sawn/rem tha tur a ni.

v) Injectable leh Opthalmic Preparation a nih chuan uluk lehzual a ngai a, a lang mai theiah hian bawlhhlawh a lang em? A leak em?

A temperature dik taka vawn tur a ni a, lum lutuk te, vawt lutuk te, direct-a ni chhuntir loh te, a vawn that nan Refrigerator hman pawhin uluk taka adjust tur a ni (eg, whole human blood - temp between 4°C to 6°C, Sera, Toxin, Toxoid - in cold place, ie. 8°C, Antibiotics - in cool place, ie. between 10°C to 25°C, Insulin Inj - 2°C to 8°C chutiang zelin).

vi) Narcotic Drugs a nih chuan, a vawnna Stock Book pawh a hranpaa siam tur a ni a, tah chuan a leitu emaw hmangtu hming leh kum, veng, hman ni leh Doctor hming leh hman zat fel taka ziah lan zel tur a ni.

vii) Kan hnena damdawi awm reng reng hi a hmanna kan hre ngei tur a ni a, a hmanna hriat loh leh a hming chiang lo leh expired drugs chu damlo hnenah pek chhuah miah loh tur a ni.

viii) Kan procurement lamahte hian, stock-ah damdawi a chuang rum tur a ni lo va, kan mamawh daih tur te, Emergency-a hman tur te, ruahmanna fel taka enchian fo a, chumi mila indent/supply order siam a tha.

ix) Damdawi thi (expired) a lo awm palh loh nan a chunga kan sawi tak expiry date hi check fo tur a ni. A lo awm palh a nih pawhin mahnia paih bo mai lovin, thu nei tu sangah hriattir a, tih dan ngaihtuah ni se.

Pharmacist-te hi Doctor-te thawhpuitu kan nih avangin anni'n thawh tur min tuk chi reng reng hi rinawm tak leh taima taka kan thawh a ngai a ni. Project thar a lo chhuahin, kan pute tan hian rawih ve tlak ngei tura kan lo inbuatsaih ve zel a ngai a ni. 'Damdawi sem leh enkawl bak hi ka tih tur a ni lo,' kan tih mai chuan pute beiseina kan thleng pha lo thei. Kan hriat phak loh tur Health Department hnuaiah hian eng project mah hi a awm bik lo (heng Operation leh Laboratory Investigation practice tih loh). Keimahni hi hman tlaka kan lo inpeih ve a ngai a ni mai.

Tun hmaa kan pute khan damlo enkawlnaah engkim an lo thawk a, daktawr (Doctor) ai an lo awh thin chuan tunlaia lehkha thiam zawkte hian an tha tichak tur hian tih theih kan nei ve ngei ang. (Kei pawh hmun pakhatah chuan, ha ka phawi thiam em avang hian Pharmacist-te chu ha phawi hi kan hna ber emaw an lo ti vel!) Chuvangin, han ti daih tawh mai teh ang, kan mawhphurhna hi hlen tur chuan kan pute (Compounder Babu) inpekna leh hma lo hruaina kha theihnghilh mai lovin, kan awmna hmun theuhah Pharmacist-te hian hmasawn zel turin tan i la theuh teh ang u. Pharmacy kan hawng a nih pawhin damdawi quality tha, company rintlak ngei dawr ila, vantlang hriselna tichhe thei zuar lo ngam ila, sum ringawt ûm lovin Pharmacy atanga hralh dan tur dik taka damdawi hi hralh a nih chuan drug abuse tihte hi a awm theiin ka ring lo. 'Sumdawnna khawvelah hian a lutuk a awm' tih mi ti-ti ka hria a, chuvangin Pharmacist kan nih chuan dan ang taka hna thawk turin tan i la theuh ang u.

GLP-1: A NEW TARGET FOR TYPE 2 DIABETES

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Diabetes mellitus (DM) is a chronic metabolic disorder consisting of a group of syndromes characterized by hyperglycaemia; altered metabolism of lip ids, carbohydrates, and proteins; and an increased risk of complications from vascular disease. Most patients can be classified clinically as having either type 1 or type 2 DM. The American Diabetes Association (ADA) criteria includes symptoms like when the renal threshold for glucose reabsorption is exceeded, glucose spills over into the urine (glycosuria) and causes an osmotic diuresis (polyuria), which in turn, results in dehydration, thirst and increased drinking (polydipsia) and unexplained weight loss. A random plasma glucose concentration of greater than 200 mg/dl (11.1 mM), a fasting plasma glucose concentration of greater than 126 ml/dl (7 mM), or a plasma glucose concentration of greater than 200 mg/dl (11 mM) 2 hours after the ingestion of an oral glucose load indicates diabetes. Diabetes mellitus causes a number of complications like retinopathy, neuropathy, nephropathy and peripheral vascular insufficiencies. Various complications develop as a consequence of the metabolic derangements in diabetes, often over many years. Many of these are the result of disease of blood vessels, either large (macrovascular disease) or small (microangiopathy). The major cause of the increase in the prevalence of diabetes is overweight and sedentary lifestyle of the people. According to World Health Organization (WHO), more than 180 million people worldwide have diabetes. This number is likely to be more than double by 2030. In 2005 alone 1.1 million people died of diabetes. Almost half of these deaths occur in people under the age of 70 years; 55% of the victims are women. WHO projects that death due to diabetes, will further increase by more than 50% in the next 10 years.

WHO classified Diabetes mellitus into three major forms:

Type 1 diabetes (T1DM), formerly known as insulin-dependent diabetes mellitus (IDDM) or juvenile-onset DM, is an autoimmune genetic disease resulting from an absolute deficiency of insulin due to destruction of pancreatic β-cells and characterised by a lack of insulin production. The symptoms include excessive excretion of urine (Polyuria), thirst (Polydipsia), constant hunger, weight loss, vision change and fatigue.

Type 2 diabetes (T2DM), formerly known as Non-insulin dependent diabetes mellitus (NIDDM) or adult- onset DM is accompanied both by insulin resistance (which precedes overt disease) and by impaired insulin secretion, each of which are important in its pathogenesis. Such patients are often obese and usually present in adult life, the incidence rising progressively with age as β-cells function declines. Type 2 diabetes comprises of 90% of people with diabetes around the world, and it is largely the result of excess body weight and physical inactivity.

Gestational diabetes is a hyperglycaemic condition which is first recognised during pregnancy. Symptoms of gestational diabetes are similar to those of T2DM. Gestational diabetes is most often diagnosed through prenatal screening, rather than reported symptoms.

Current therapy for Diabetes:

Table 1: Current therapeutic agents for type 2 diabetes (Moller, 2001).

Drugs Class	Molecular target	Site(s) of action	Adverse events
Insulin	Insulin receptor	Liver, muscle, fat	Hypoglycaemia & weight gain
Sulphonylureas e.g. glibenclamide & nateglinide	Sulphonylureas receptor/ K^+ ATP channel	Pancreatic ß-cells	Hypoglycaemia & weight gain
Biguanides e.g. metformin	Unknown	Liver (muscle)	Gastrointestinal disturbances & lactic acidosis
Thiozolinediones e.g. rosiglitazone & pioglitazone	PPARγ	Intestine	Weight gain, oedema & anaemia
Acarbose	α-glucosidase	Fat, muscle, liver	Gastrointestinal disturbances

Glucagon-like peptide 1 (GLP-1)

Type 2 diabetes is characterized by progressive β-cells dysfunction and a reduction in β-cells mass. Pancreatic islets are a target for adverse effectors such as

high concentrations of glucose, pro-inflammatory cytokines and increased free fatty acid concentrations, which are associated with adiposity, insulin resistance and the induction of β-cell apoptosis. If the β-cell mass is already below the threshold for maintaining normoglycemia, the expansion of β-cell mass is the only option for achieving normoglycemia without the use of additional glucose lowering agents (de Koning et al., 2008). Therapies based on glucagon-like peptide-1 and combinations of growth factors such as epidermal growth factor and gastrin are promising new strategies for β-cell preservation.

It has long been recognized that there is greater insulin secretion in response to an oral glucose load than to an intravenous glucose load, even when the glucose concentrations after both challenges are similar. This observation has been termed the 'incretin' effect and is due to the release of incretin hormones from gastrointestinal neuroendocrine cells. The two main incretin hormones are glucagon- like peptide (GLP)-1 and glucose-dependent insulinotropic polypeptide (GIP). GLP-1 is a 30-amino acid peptide that is released from L-cells, which are assumed to be located mainly in the distal part of the small intestine and colon. It is produced by tissue-specific alternative splicing of proglucagon. GIP is a 42-amino acid peptide that is released from gastrointestinal K-cells, which are located mainly in the proximal part of the small intestine. Both peptides are rapidly inactivated through removal of the two N-terminal amino acids by the enzyme dipeptidyl-peptidase-IV (DPP-IV). Activation of the GLP-1 receptor on pancreatic β-cells stimulates insulin secretion and biosynthesis in a glucose-dependent fashion, thus lowering blood glucose levels. A synergistic action between glucose and GLP- 1 has been reported and, in patients with type 2 diabetes, the incretin effect is considerably reduced. GLP-1 secretion is impaired after a nutrient stimulus, whereas continuous GLP-1 infusion lowers plasma glucose levels, improves the first and second-phase insulin response and reduces appetite in patients with type 2 diabetes, providing a rationale for a strategy of GLP-1-based therapy. Nevertheless, compared with those from healthy subjects, β-cells from patients with type 2 diabetes are less responsive to GLP-1. This observation could be explained by the downregulation of GLP-1 receptor mRNA expression in β-cells during exposure to high glucose concentrations (Xu, 2007). GIP also increases insulin secretion by activating the β-cell GIP receptor. Despite GLP-1 and GIP contributing equally to the incretin effect, GIP does not act on islet α-cells, and β-cell responsiveness to GIP is greatly reduced in type 2 diabetes.

Role of GLP- 1 in glucose homeostasis

Secretion

GLP-1 was discovered in 1984 and is a product of preproglucagon gene. It is expressed not only in pancreatic β-cells but also in the L-cells of the intestinal mucosa, one of the most abundant cells in the gut. GLP-1 is derived from the larger proglucagon precursor that encodes not only GLP-1 but also the related proglucagon derived peptides glucagon, GLP-2, oxyntomodulin and glicentin. GLP-1 is secreted in response to the absorption of glucose, other sugars and fatty acids and to a minor extent amino acids. Despite the more distal location of most L-cells, circulating levels of GLP-1 increase more rapidly within minutes of food ingestion, leads to suggest that GLP-1 secretion from the distal gut is controlled by both neural and endocrine signals initiated by nutrient entry in the proximal GI tract, as well as the subsequent direct contact of open-type L-cells with digested nutrients (Arulmozhi et al., 2006).

Physiological effects

GLP-1 action in the β-cells is mediated by binding of the peptide to specific seven-membered transmembrane receptors. Activation of this G-coupled receptor causes an increase in intracellular cAMP concentration and activation of protein kinase A (PKA). GLP-1 acts directly through the cAMP/PKA pathway to enhance and sensitize β-cells to glucose-stimulated insulin secretion. GLP-1 has been shown to stimulate insulin secretion in vitro and in vivo and also upregulating insulin gene expression and promoting insulin biosynthesis. The glucagon inhibition exhibited by GLP-1 is mediated directly via its receptors on β-cells or indirectly due to inhibition via insulin and somatostatin secretion. GLP-1 regulates gastric emptying, by which in turn controls the postprandial glucose homeostasis. This effect seems to be regulated by neural mechanisms initiated by vagal afferent nerves. Recently GLP-1 receptor ligands have been demonstrated to induce β-cell neogenesis and increase islet cell mass in normal and diabetic rodents. GLP-1 signalling also stimulates the differentiation and maturation of progenitor cells into β-cells and GLP-1 inhibits β-cell apoptosis contributing to the overall effect of increasing β-cell mass. Chronic or repeated intracerebroventricular administration of GLP-1 caused a decrease in food intake and body weight gain, which could be effected through the GLP-1 receptors located in the CNS. In human it promotes satiety and decreases food intake in healthy subjects (Arulmozhi et al., 2006).

Effects of GLP-1 in diabetic state

The GLP-1 effects are known to be reduced in patients with diabetes, resulting in low insulin secretion following oral ingestion of nutrients. Recent studies have indicated that plasma levels of GLP-1 are reduced inT2DM patients or in patients with impaired glucose tolerance, as compared to normal subjects. The factors suggested to influence GLP-1 secretion are severity of diabetes or body mass index (Gautier et al., 2005). GLP-1 is effective in type 2 diabetic patients, increasing insulin secretion and normalizing both fasting and postprandial blood glucose when given as intravenous infusion, even in subjects with advanced type 2 diabetes long after sulphonylurea failure. Although high plasma levels of immunoreactive GLP-1 were achieved, insulin secretion rapidly returned to pretreatment levels and blood glucose concentrations were not normalized. Nevertheless, the effect of repeated subcutaneous administration on fasting blood glucose is as good as that of intravenous administration (Arulmozhi et al., 2006).

Metabolism of GLP-1

An important regulator of the biological activity of GLP- 1 is N-terminal degradation by the common, endogenous, aminopeptidase enzyme, dipeptidyl peptidase IV. This enzyme removes the two N-terminal amino acids histidine and alanine from GLP-1, yielding the N-terminally truncated form, GLP-1(9-36) amide. This metabolite of GLP-1 is inactive in stimulating insulin secretion or reducing glucose levels and may even be an antagonist or partial agonist for the GLP-1 receptors. Hence, the metabolism of GLP-1 by DPP-IV is largely considered to be an inactivation process. The efficiency of DPP-IV is high, resulting in such a rapid metabolism of GLP-1 that the half-life of circulating peptide is very low, approximately 1-2 min (Arulmozhi et al., 2006).

GLP-1 as a new drug target

There has been a great need for the new therapy for diabetes mellitus, due to the adverse and side effects of the currently available drugs. Thus, GLP-1, an incretin hormone, is a novel pharmacological target with multiple antihyperglycemic actions. The following sections describe recent research results for the pharmacological approaches based on GLP-1 towards antidiabetic therapy and the advantages that treatment of type 2 diabetes with GLP-1 mimetic and or DPP-IV inhibitors may offer over current therapy.

Therapeutic approaches based on GLP-1

Two approaches for circumventing the rapid inactivation of GLP-1 have been successfully met. One is the development of GLP-1 receptor agonist peptides (GLP-1 mimetics), which are not substrates for DPP-IV and show only low affinity for the enzyme, thereby avoiding the rapid degradation and thus ensuring prolonged circulation time. The other strategy is to inhibit the enzyme DPP-IV, thus preventing the degradation of GLP-1 and allowing the daily fluctuations of GLP-1 levels that follow each meal to be augmented (Arulmozhi et al., 2006). Other potential strategies like enhancing the release of GLP-1 from the gut during the meal intake have not been probed. Therefore, two classes of compounds may be utilized as therapeutic agents, GLP-1 receptor agonists (GLP-1 mimetics) and DPP-IV inhibitors.

DPP-IV resistant GLP-1 receptor agonists (GLP-1 mimetics)

DPP-IV resistant GLP-1 analogues usually have one or several of the amino acids in GLP-1 substituted or have peptide structures that are changed in some other way, thereby reducing the affinity of the analogue for the enzyme. Several GLP-1 analogues are currently undergoing human clinical trials. Examples: Exendin-4 (Exenatide, Byetta), Liraglutide (NN2211), CJC-1131.

Limitations and disadvantages of GLP-1 analogues

1. Route of administration: The major problem with GLP-1 peptide analogues is the lack of orally bioavailable dosage forms. The need for subcutaneous or intravenous injection limits their use (Arulmozhi et al., 2006).

2. Chemical stability: The stability of GLP-1 analogues is limited in solution by time, temperature and pH. Extreme conditions favor racemization, hydrolysis of peptide bonds, deamidation and oxidation of amino acids. However liraglutide and exenatide are reported to be stable(Arulmozhi et al., 2006).

3. Immunogenicity: GLP-1 analogues are potentially immunogenic. Antibodies to 36-residue natural peptides such as neuropeptide Y can be produced in rabbits without high molecular mass carriers. Therefore, antibody formation to these compounds should be considered with chronic treatment. However, so far none of the reported compounds found to be immunogenic(Arulmozhi et al., 2006).

4. Side effects: As sustained GLP-1 application slows down gastric emptying, nausea and vomiting have been observed in clinical trials. This is a serious disadvantage after application, high doses or potentially after long-term administration. In rodents, it has been reported that, GLP-1 leads to undesirable effects such as increased heart rate and blood pressure, however the same has not been observed in human trials with any of the compounds (Arulmozhi et al., 2006).

Dipeptidyl peptidase IV inhibitors

DPP-IV (also known as CD26) is a glycoprotein consisting of 766 amino acids in humans and 767 amino acids in rats, there is an 85% identity between human and rat sequences. A high expression has been observed in kidney, where DPP-IV is localized to the glomerular basement membrane and the proximal convoluted tubules. However, the enzyme is expressed in other tissues as well and found widely distributed throughout the body.

Classes of DPP-IV inhibitors

In respect of current clinical developments of the thousands of individual compounds prepared in the mean time, three classes of DPP-IV inhibitors are under investigation namely reversible product analogue inhibitors (e.g. pyrrolidines and thiazolidines), covalently modifying product analogues (e.g. cyanopyrrolidines) and reversible non-peptidic heterocyclic inhibitors (e.g. xanthines and aminomethylpyrimidines). Because of the different modes of action (non-covalent reversible or transiently covalently modifying inhibitors), two treatment principles currently under investigation are meal dependent administration of short acting DPP-IV inhibitors with the goal to minimize potential side effects or long acting inhibitors with once a day dosing potential (Demuth et al., 2005). Examples: Vildagliptin (LAF237), Sitagliptin (MK-0431), Saxagliptin (BMS-477118), P32/98.

Limitations and disadvantages of DPP-IV inhibitors

1. Multiple functions of DPP-IV: As DPP-IV is a pleiotropic enzyme that cleaves, and thereby generally inactivates, a variety of peptide hormones, neuropeptides and chemokines. In addition to stabilizing the incretins GLP-1, GIP and PACAP, DPP-IV inhibitors also prolong the action of hormones peptide YY and growth hormone-releasing hormones, the neuropeptides neuropeptide Y and substance P, and chemokines. Potential side effects resulting from the prolongation of action of these messengers include neurogenic inflammation (substance P, neuropeptide Y), enhanced general

inflammation, and allergic reactions (chemokines) (Arulmozhi et al., 2006). However, to date, such side effects have not been observed in preclinical animal or clinical human studies.

2. Inhibition of other similar enzymes: Enzymes with similar catalytic activities of DPP-IV like DPP-2, DPP-8 and DPP-9 may well inhibited due to the similar catalytic site. New data have shown that inhibition of DPP-8 and DPP-9 seems to be responsible for toxic effects such as alopecia, thrombocytopenia, anaemia, enlarged spleen, multiple histological pathologies and mortality.

Advantages over current targets

One of the most exciting features of GLP-1 receptor signalling is the potential to expand β-cell mass. In rodents, GLP-1 receptor signalling increases the expression of key transcription factors such as pancreatic homeodomain protein (PDX)-1, increases β-cell mass by both islet neogenesis and β-cell proliferation and stimulates differentiation of putative precursor duct cells into a β-cell phenotype (de Koning et al., 2008). GLP-1-based therapy, supported by data indicating that GLP-1 promotes β-cell survival by inhibiting apoptosis, remains a promising strategy for the preservation of β-cell mass. In addition, treatment of type 2 diabetes with GLP-1 agonists or DPP-IV inhibitors seems to be more promising because; available data indicate more efficacy in maintaining glucose level with lesser side effects like hypoglycaemia, weight gain and edema. Also in more recent studies GLP-1 has been reported to protect against myocardial infarction in the in vitro and in vivo animal models, probably through activation of prosurvival kinases, which adds value to the GLP based therapy in diabetes as vascular complications are secondary to diabetes (Bose et al., 2005). GLP-1 based therapy also has the advantage in the treatment of obese-diabetic, as it reduces appetite. The beneficial therapeutic effects of combination of DPP-IV inhibitors with PPAR-α agonists (rosiglitazone) (Wargent et al., 2005) and sulphonylureas (glibenclamide) (Takasaki et al., 2004) would pave the way to new therapeutic calculations for the individualized therapy for the correction of postprandial hyperglycaemia.

Conclusion

Despite of the availability of various antidiabetic agents which are successful to a considerable extend, more potential and effective agents or targets are still in need to treat diabetes in a more effective and safer way. Among many newly evolved biological targets GLP-1 is one which seems to be very promising for therapy of type 2 diabetes. GLP-1 mimetics and DPP-IV inhibitors are both effective antidiabetic agents

in once- or twice-daily dosing, and have been shown to maintain decreased HbA1c levels for at least one year. Both approaches have been evaluated as monotherapy or in combination. The main advantage of GLP-1 mimetics is their induction of weight loss, whereas their strongest limitations are the potential for immunogenicity, the frequent occurrence of nausea and vomiting, a requirement for subcutaneous administration and the existence of non-responding patients (exenatide). The advantages of selective DPP-IV inhibitors include oral bioavailability and excellent tolerability, with no major side effects yet reported in humans. However, although the beneficial effects are similar, no weight loss is observed with DPP-IV inhibitors. Further long-term clinical studies are needed to determine whether GLP-1- based therapies confirm their potential in β-cell protection and retardation of the progression of type 2 diabetes.

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HMANLAI KAN KRISMAS HMAN VE DAN

C. Zoliana
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Ramthar Veng, Aizawl

Krismas kan tih fo thin hi kan Mizo tawng a ni lo va, Latin tawng, English-a hman tak niin a lang. 'Mas' tih awmzia chu sacrament chi khat, Pathian biak nan kohhran hmasaten an lo hman thin a ni a. 'Krista ruai' emaw, inthawina emaw Kristian-ten an lo hman thin a ni a, AD 350 vela hman tan a ni an ti. Tun thleng hian kan kohhran pawhin kan ngai ropuiin, kan hlut em em a ni. A hun lai athuin a danglamin hman dan a va nuam hlei ta em! A hre ve lo tan chuan mumang ang chauh a ni ang chu le.

Thang hnih liam zet a ni ta. Kan hman ve dante lungleng takin ka'n sep ve teh ang. December ni 25 hi kan hre ngai lo va, tahrik leh sana leh calendar te awm ve hek lo, zirtirtupa (PS teacher) inah chauh MONKUMAR GUHA tih intar chu kan hrethiam ve mang lo a ni. Khaw khatah kamding pakhat emaw lek an awm a, mi dang chu lo nei mi vek kan ni.

Thlasik buh seng lai a ni a. Ram riak tho takin kan haw a. Lawmnu hluite chhawl thuai nan Chuailo, Zamzo, Arakhuan, Sappuipar nen, 'Ka thlang thiam bil lo che Di thuai nan,' ka ti ve zuk nia. Mas hmang tura chawlhkar khat lai hna thawh loh chu kan nghahhlelh ber a ni thin. Ke sir khi pawh a mam deuh ngei ang le. Bialnute chawn leh ngal chât tunlai angin hnawih tur awm hek lo, mawi kan ti ve tho thin asin. Chhawrthlapui eng, zan daifim pawisa lova Mas rorel tura pa ho kalkhawm chuan, 'Khualkhuaah Sechal kaih tur,' tih an han rel meuh chu khawtlang ti-ti a khat nghalin nunau an hlim teh asin. Val tlawmngai leh pathlawi hoten Vau hrui leh Khuangkhau hrui akin zan thum lai an riah hnuah Sechal hmai rang an rawn kai chu, naupang au leh uisen rawl nen, tlangsam par an rawn tar a. A thlengtu mual kilin lian deuh an han thlung ta ngur mai a. Tunlai ang hian

naupang intihhlimna awm ve hek lo, Mas Se chaih a, dimna nei hauh lova han vuak lim vel chu kan nghahhlelh chhan a ni ve reng a. Khuala Se kai hawngte chu an bal deuh tawh a, fenthlira chingal fir kengin zotui thiangah lu su, inbual turin ram awmpawng nen fai takin sabawn tel miah lovin an inbual thin a. Lifebouy, surf leh shampoo te chu kaha! Heng hun lai hian kohhran chu Mas programme-ah a inrawlh vak ngai lo.

URLAWK TLAIVAR ZAN

Inkhawm banah lenkhawm chu kan han tan a. Val-upa khuangpu puan veng, ke khi hrek hrawk, lu hram deuh, hmuihmul pawh ziat lo, hnar hmul lang deuh sung khan khuang chu a rawn chang a. A rawl pawh mi baka tha a ni ang e. Vawk chaw pekna thirbel lianin a laiah mei kan han chhem a, laltin eng vak lo DIPTI chhiin bul kan han tan chawt a. Sanate awm ve hek lo, zanlai ar khuan hun chuan zai a tui tan a. A vawtin vurte a lo tla tan a, thawmhnaw lum engmah la nei ve hek lovi le, Ludhiana wool Rs 12.50 man, dumpawl kha bialnute nen inzawnin hma lam tlin chiah lo hian long clothe kawr tha hain kan inkuah chial mai chu, veng dangah Mas an hmang ve tih pawh kan hre ne'm.

Zan a lo rei a, hla bu-té hlui, a kawm tla, zawr tawh taka mi, 'Min hmangaih hi tuma'n an hnial thei lo ve,' tih sak veleha ke zungpuia min han kheuh zauh mai chu Arial hlawh lak aiin a ngaihthatthlak zuk nia! Rilru nei deuh val chu a hma lam engah hian an thu ngai lo va, tlar hnung deuhvah zai laia se se-a thu sawi theihna hmun thlan an ching fo thin. Khawvar ar a lo khuang a, Mizo chhangban leh thingpui sen leh kurtai an han sem a, a aia sang engmah kan phut lo, kan beisei pha hek lo. A hnuah hla kan han sa leh a, veng mawng nuthlawi, bahsam kir deuh khan hla a'n hril leh a, 'Aw hmangaihna ka sawi seng lo na, ka ngawi thei lo,' sak lai takin a rulh ve nan puan chhanah han sik ve hlak ila, an lawm zawk daih nia. Tichuan, chhuna in lama mu tur chuan kan haw ta a. Tlaia Mas sa duh tawka ei chu kan hmabak ta a ni.

Biak-inah Krismas kan hmang ngai lo va, tualzawlah thian duhte nen hming phela inkovin, duh tawkin kan ei ta thin a ni. Sa alna tur chite hi naupangin in tinah an khawn a, hmeichhe thalaiten satui an hawp ve ngai lo.

Hetih hun lai vel hi chuan sa a vangin naupang leh tlangval ten sa kan ei khat em em a. Mas sa ei hi kan chakin kan nghakhlel em em thin. Zan hnihna kan tlaivar leh a, a tukah kan nawn dawn tih hriain kan zai tui thin hle a ni. Tlangnu, tlangpa tling deuh an tui chuan kum thar thlengin (kan nawn a) ruai kan theh zawm chang pawh a awm. Kan zai tui a, lung a len chuan Lalpa hausakna kan tawmpui mai a ni.

KUM THAR LAWM

Kum hlui thlah zan chuan kan tlaivar leh a. Kum thar, January ni 1 chu

ruaiin kan hmang leh a. A lungleng deuhten bawng emaw, vawk emaw an thawh a, mitha leh retheiten kan kil tlang vek thin a, a va hlu tak em! Heng hun lai hian sa a tlawm a, Sechal pawh Rs 200 atanga Rs 300 te chauh a ni. Kum thar hun lai hi lunglen hun lai a ni fo thin. Thiam taka zaia romei zam chuk laia Sechal ki han vuak buk buk mai chu bengah hian a cham rei duh teh asin. Kum thar kan tiak a, pawlbuk lama hnathawh kawr nena han liam meuh chu, sulhnu a lo thing a, bukthlam tualah Zamzo, Derhken leh Chuailo par te chu 'In hmang nuam ve em?' han tih mai a awl teh asin.

E khai! Mimsirikut leh Thuva ten buk vel thingro zara lunglen min han hnem a, urhsun taka an han chukchurukurh chu Di ngaih lunglen baka khawtlang lunglen inkawp chu, val kan kur a ni ber mai. Kum leh Mas chu a va rei dawn em!

Ka dawn ngam lo, hmanah Lal pian ni champha
Tlaikhua kan var leh dawn lo'm ni, Ainawni?

Heng hun lai hian lirthei - car te, halpuah te, incheina tha te, mobile te, TV te, engmah a la awm ve lo. Kan neih, kan chan tawkah kan lung a awi em em mai a ni. Natna - cancer, HIV, hepatitis leh septicemia te chu vana rah ang mai a ni. Rinawmna leh taknaah pawh kan urhsunin kan thianghlim a, tunlai thangthar ho Krismas te zawng a ho lutuk e, sual nan chauh an hmang ang tih a hlauhawm khawp mai.

DAMNA TIFAMKIM TURA KAN MAWHPHURHNATE

Dr. Mary Lalnunpuii Ralte (AYUSH)
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Khawvel changkang chho zelah hian natna pawh a lo pun belh ve zel bawk a. Damna duhin damdawi lam thiam tak takte kan rawn a, kan insensonate pawh a sangin, kan 'nunna' hial pawh kan thàp lo chauh a ni!

Natna tam zawkte hi chu kan duh thlanna dik lovin a nghawng te, kan khawsak dan leh ei leh in dik lovin a hrin chhuah te a ni fo thin. Chung natna tihdam nan chuan damdawiah kan rinna kan nghat thui em em a, 'tidamtu' ber ang maiin a hnathawh kan nghak a ni ber .

Amaherawhchu, tih ve tur thahnem tak kan nei ve tho va. Doctor thiamten an damdawi chawhah ringawt kan innghah chuan kan damna a famkim tak tak thei dawn lo a ni. Keimahni taksa a nih avangin a enkawl hna chu kan mawhphurhna a ni ve a. Siamtu Pathianin mihringte min siamin, kan taksa ruangâm leh kawchhunga khawl (organ) zawng zawngte chu leilunga A thil siam dangte nen inrem thlap thei turin leilung dan (Natural laws) kan zawm theuh tur A lo duang lawk vek a. Chu dan kan zawm chu kan tan damna leh hlimna ber a ni.

Damdawi kan ei leh inenkawlna (treatment) kan neih pawha kan zawm ngei tur hrang hrangte chu ilo en ila:

I. KHAWSAK DAN (LIFESTYLE):

Kan khawsak changkang leh sang chho zelah hian tih tur leh ngaih pawimawh a lo tam a, rualawhna te, san zel duhna te, inelna hrang hrang te a lo pung zel a. Hei hian kan rin phak bakin kan nun a ei chhe nasa em em a. A bik takin kan taksa hi khawl chhe thei lo ang main kan dìm lo hle a. A lo na a nih chuan na chhawkna emaw, han dam nghal vatna tur erawh kan ngaihtuah ruai thin. Amaherawhchu, kan khawsak dan a dik si loh chuan eng anga damdawi tha pawh ei mah ila, damna tak tak a thlen mawh hle a ni. Kan khawsak dan thenkhatin kan hriselna a nghawng dan tlangpui i lo tarlang teh ang:

1) Chawlh hahdam: Taksa chawlh hahdamna awm lek lova thawh vak mai te hian hriselna a tichhe thei hle a. Damlo inenkawl mekte chu sawi loh, dam tha pangngaite hriselna tikhawlotu a ni fo thin. Zan rei tak tak thlenga hna thawh te, lehkha zir te, nawmsip bawlna lam atana infiamna te hi a tha chuang lo a ni. Sum leh pai thawhchhuah tam duh vanga thawh vakna hian hriselna a tichhiain, thawhchhuah sa sum leh paite pawh chu hriselna neih let lehna atan hman ral leh a ni fo thin a ni.

2) Insawizawi (Exercise): Taksa insawizawina hi infiammi te, inla 'fit' duh te tan emaw, intihchèr duhte tan chauh emaw tih tur emaw kan ti fo thin a. He ngaihdan hi a dik lovin a pawi hle a, mahni kan inbumna pakhat a ni. Damlote tan pawh an natna azirin an theih ang tawk tawka nasa lutuk lo pawha han insawizawi hi damna tikimtu pakhat a ni.

3) Ni éng dawn that: Ni éng hian kan nunah tangkaina a neihte chu kan sawi seng lo vang a. Amaherawhchu, kan taksa hriselna atana a pawimawhzia hi ka ngaihthah fo thin. Kan chenna leh a chhehvelte chu ni dawng tha tak niin, kan mutbu leh puan te chu ni-ah kan pho chhuak fo tur a ni a; natna hrik tam tak a tihhlum thei tih kan hre reng tur a ni. Mahse, vun natna veite emaw, ni zung natna vei te tan erawh chuan doctor thiam bik (skin specialist)-te rawn a tha.

4) Boruak thianghlim hìp tam: Boruak hi a tel lova kan nun theih loh thil pawimawh em em a ni a. Thisen tha leh thianghlim nei tur chuan boruak tha kan hìp tam a tul a. Hetianga boruak thianghlim han hìp pap pap hi chuan min tiharhvangin, min tihlim sawt thin. Boruak thianghlim hi damlo tan pawh chaw tha an mamawh ang bawkin an dam chak theih nan a pawimawh a. A bikin chuap lam tha lo (heng TB te, bronchitis,etc) veite tan phei chuan chhun leh zana boruak thianghlim an dawn that hi a pawimawh takzet a ni.

5) Tui thianghlim tam tawk in: Kan taksa timur (cells)-te hian tui an mamawh em em reng avangin tui in tam hi kan taksa enkawlna atana pawimawh em em a ni bawk a. Tuihal vang ringawta tui kan in thin hi a dik ber lo va; ka tuihal meuh tawh chuan kan taksaa tui awm 3% aia tam a lo bo zo tawh tihna a ni zawk. Zun a eng emaw, a tak hle a nih phei chuan, tui kan in tlem lutuk a ni tih hriat tur a ni a. Ni tin 'regular' taka tui kan in reng hi a tha ber a. Vawi leh khata in teuh lovin, darkar tina in hi duhthusam a ni. Zing thawh veleha tanin hetiang hian kan in tur a ni. Khua a lum a, taksa a lo zawi deuh chuan tui in tam lehzual kan mamawh a ni.

6) Hun vawn dik: Hun vawn dik hian nasa takin hmasawnna min thlen a. Kan taksa kan enkawl danah phei chuan a pawimawh hle a. Ei hun bi te, mut hun bi fel tak kan neih thlap chuan kan lo hrisel sawt ngei ang. Tin, damlo inenkawl mekte tan chuan doctor-te thurawn ngaih pawimawh hi a tul a. Damdawi ei hunbi an sawite ngun taka ngaithlaa zawmin, inentir leh tura an tih hunah tak kan kal leh thlap chuan nasa takin kan hlawkpui ngei a rinawm. Mi tam takte hi chuan damdawi tha leh to tak takte kan han lei ve a, mahse a hunbi dik taka ei te kan lo theihnghilh leh a; kan duh hun hunah, a that ve tho ringin kan han ei leh ngawt a. Tin, kan ei hun tur course pawh a zawh hmain kan bansan a, kan lo rin dan leh dam kan duh huna kan dam nghal mai thin loh avangin kan sawisel zui fo bawk. Hetah hian dawhtheihna leh thuawihna kan mamawh a ni.

II. EI LEH IN:

Ei leh in hi a tel lova mihringte kan nun theih loh zinga mi pakhat a ni a. Kan taksain chakna kan dawnna hnar ber a nih laiin, kan fimkhur loh erawh chuan natna tam tak min thlentu a ni thei bawk. Tin, damlo inenkawl mekte tan pawh, an châk avanga an ngeih loh zawng an ei luih tlat chuan damna tak tak an nei thei thin lo. Mihringte suala kan tlukna chhan pawh kha 'ka châkna' vang bawk a ni a. Kan ei leh in hian kan hriselna leh thlarau nun nasa takin a nghawng a ni.

1) Chaw tha ber: Kan tunlai khawvelah hian natna a pung tial tial a. Kan awmna leh a velte pawh tunhma zawng aia a lo bawlhhlawh tawh zawk avangin tun hma zawng aiin kan ei leh inah pawh kan fimkhur a tul tawh zawk a ni.

Kan taksa tana chaw tha ber hre tur chuan Pathianin mihringte a tira A siam dan kha kan zir nawn leh a ngai a ni. Siamtu khan Adam-a leh Evi te hnenah khan an ni tin chaw ei tur A lo duansak sa vek a, chungte chu thlai te, theirah te, thei kawrsak (nuts) te a ni.

Amaherawhchu, tuilêtin khawvela thil zawng zawng a tihchhiat avang khan sa ei phalna pek an ni ta chauh a. Sa hi mihringte tana chaw tha ber erawh a ni hauh lo va. Hei hi a chianna em em chu mihringin sa an ei atang khan an dam rei hun chhung nasa takin a tawi phah a ni.

2) Chaw thial ngun: Kan chaw ei, kan taksain a chhawr tangkaina hi kan ei zatah ai mahin kan thial ngun leh ngun lohvah a innghat thui hle a. Ngun taka chaw kan thial hian chilin tha takin a lo pawlh a, chu chu tha taka chaw paitawihna atana rahbi pakhatna a ni. Hun chep tak kara ei tur i nih chuan, hmanhmawh taka ei teuh lovin, tlem te ei la, ngun takin thial zawk rawh. Rilru a chi-ai lai emaw, hmanhmawh laia ei ai chuan hahchawlh phawt a, rilru leh taksa a hahdam deuh huna ei hi a tha zawk a ni. Hei hi a chhan chu, rilru leh taksa a hmanhmawh lai hian chaw pai tawihna atana min puitu (digestive fluids) te hi a tam tawk thin lo a ni.

3) Zing chaw ei that: Nilenga chakna kan hmuhna tam zawk hi kan zing chaw ei atangin a nih avangin kan ngai pawimawh hle tur a ni a. Zing lamah hian kan pumpui hi chhun lam leh tlai lam aiin tha taka chaw lo pai tawih turin a lo inring zawk a ni.

4) Mut dawna chaw ei loh: Zan lama chetla chi (nocturnal animals) kan nih loh avangin zana kan mut hian kan taksa khawl hrang hrangte hi a lo thawk muang ve a. Chutiangin kan chaw pai tawihna khawl pawhin chawlh a lo duh ve thin a. Amaherawhchu, mut dawna thil kan ei chuan, kan pum hian zankhua deuh thawa a thawh a lo ngai a. Tichuan, mut a titui lo va, mumang duhawm lo pui puite kan lo neih phah thin a ni. Tin, tlai lam emaw, zan lama chaw ei teuh hi zing lam emaw, chhun lam emaw tea kan ei ang lo takin taksain a lo hmang tangkai em em lo va; zan lamah chuan kan taksa a lo hahchawlh tawh thin avangin, chaw-a chakna tam tak (calorie)-te kha hman (burn up) a nih loh tâkah chuan thisen dâwt bang (walls of great vessels) velah te a lo chambang tam ta telh telh thin a. Hei hian hun a lo rei deuh hnuah phei chuan thisen dawt chu hnawhphui hialin thisen kal tur a lo dang a, natna hrang hrang, a bikin heng – thih thut theihna, lungphuchawl kan tihte hi a thlen phah hial thin a ni.

III. ZÛK LEH HMUAM

Zûk leh hmuam kan tih hian heng meizial, kuhva, sahdah, khaini, pan masala

tih zawng zawngte hi a huam vek a. Zûk leh hmuam ngawl veina hian zawi zawiin kan thluak leh thazam te a tichhe thin. A bikin vaihlo tûr (nicotine) hian nasa takin taksa khawl (organ) hrang hrangte a tichhe nasa thei hle.

Zûk leh hmuam ti reng chung si chuan eng anga damdawi tha emaw, inenkawlna (treatment) tha pawh nei mah ila, a sawt tak tak dawn lo a ni.

IV. PATHIANA RINNA NGHAH/ RILRU HLIM PUT

Damna famkim nei tur chuan kan taksa, rilru leh thlarau hriselna kan ngai pawimawh tur a ni a, 'Tidamtu ropui ber' Pathianah kan rinna kan nghat tlat tur a ni. Rinna hian natna laka kan dam theih nan nasa takin min pui a. Pathiana rinna nghat tlatte chu ringlo mi ai chuan natna inang rau rauah an dam chak bikin thlamuanna an nei a ni.

Natna hrang hrang za-a sawmkuate hi kan rilruin a tihzual te a ni fo va. Mi rilru paukhauh leh inthunun thei takte chuan natnate an do chak bik a. Kan suangtuahna hian kan natna a belhchhah thei a, a tiziaawm thei bawk a ni.

A chunga kan tarlan takte khi keimahnia awlsam taka sum leh pai senso ngai miah lova kan zawm mai theihte an ni a. A dang tam tak kan sawi lan loh pawh a awm ang a, mahse kan tarlan takte kha hriselna dan leilunga Pathianin kan damna tura min duan chhuah sate an ni.

Kan zawm that chuan nasa takin natna lakah min veng thei a. Tin, damlo inenkawl mekte tan pawh dam chakna a ni. Doctor-te leh damdawi lam thiamten min hrilh vek loh pawha mi tinin kan hriat reng tur a ni. Kan dam tha thei lo a nih chuan Doctor-te emaw mawhpuh mai lo va, kan mawhphurhna hrang hrang kan sawi takte kan zawm ve em, ti a kan inenfiah a tul a ni.

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PHARMACY ZIR CHIANGIN AUSTRALIA LEH SINGAPORE-AH

Dr.H.Lalhlenmawia
Deptt of Pharmacy, RIPANS

India ram zau tak leh hnam chi hrang hrang awmna hmunah hian kan damdawi ei dan a mumal lovin a him lo hle tih hriat a ni a, chutih laiin damdawi lam thiamna nei lovin damdawi pek chhuah (dispense) a tam hle mai bawk a; hei hi mipui tan a him loin damna atana hman damdawiten mihring hriselna kawngah harsatna an tawk thei a ni tih hriat a ni a, hemi kawng lam siamthat a nih theihna atana hmalakna hmasa ber atan Pharmacy Council of India (PCI) chuan ram changkang zawka mite tih dan zir turin India atangin aiawh a tir a, a hmasa ber atan Australia tlawh turin Pu Lalsawma Pachuau, Asst. Drug Controller, Directorate of Health Services nen min thlang ve hlauh mai a, Dated 2nd to 12th November, 2009 khan Australia leh Singapore tlawhin an ram tih dante zirchianna kan nei ta a ni.

Australia leh Singapore tlawh tur hian India ram pum atangin mi 19 kan kal a, hmarchhak (North-east) atangin keini pahnih chiah kan kal a. Heta kalte hi North zone, South zone, Western zone, Eastern zone leh North East atangin Pharmaceutical Science zirtirtute leh Drug Control lam thuneitute leh Industry-a mite kan ni hlawm a ni.

Delhi atangin darkar 6 tha lam hret kan thlawh hnuin Singapore kan thleng a, darkar 3 kan chawlh hnuin Australia (Melbourne) panin kan thlawk leh a, darkar 7 zet kan thlawh leh hnuin Melbourne kan thleng a. An ram sana chu keini aiin darkar 5-in a lo hma zawk a, Delhi atanga zing dar 8:55 am-a chhuak kha, zing khawvar rualin Australia kan thleng der a ni. Khua a lo vawt hle mai a, 10°C lai a ni a, thuamhnaw lum ka lo la chhuak si lo a, vawt ka ti hle mai.

Airport-ah Mr. David-a'n min lo dawngsawng a, coffee tui tak mai nen min lo hmuak a, a nuam tan viau mai. A motor rawn kenin kan thlenna tur hotel kan pan nghal a, darkar 2 chiah kan chawl hman tihin official programme nei turin kan chhuah leh nghal a ngai a. Darkar 15 vel

zet thlawh hnuah chuan a peihawm loh duh khawp mai. Mahse, tih tur pawimawh tak neia kal kan ni a, Monash University panin kan kal ta nghal a. Dr. Ralph Stewart leh Dr. Jeniffer Marriot, Director, Bachelor of Pharmacy ten min lo dawngsawng a, Conference Hall-ah Professor dangte nen meeting kan nei nghal ta a ni. An B.Pharm Course kalpui dan chi hrang hrangte chiang takin an sawi a, chumi hnuah an hmanrua, library leh an classroom te kan fang kual leh a, a ropui hle.

Monash University hi Victoria State-a University hlun ber a ni a, B.Pharm leh M.Pharm Course te leh Ph.D thlengin a zir theih a ni. B.Pharm Course bik hi 80% vel chu clinical practice a ni a, a dang 20% vel chu Industry lam a ni ve chauh a ni. B.Pharm pass chhuak te hian clinical practice lam an thiam em em mai a, a bikin Drugs action, Pharmakokinetics, Adverse effect, Side effect leh damdawi lama patient counseling an thiam em em a, an kutah an ram pumpui damdawi lama inenkawlna a innghat a ni.

Chawhnu lamah Austin Hospital kan tlawh leh a, Hospital hotuten hnehsawh takin min lo dawngsawng a. Hospital chhunga damdawi an enkawl dan leh damlote hnena damdawi an pek dante chipchiar takin kan zir a, a bengvarthlak hle a ni.

Adelaide-ah

Adelaide hi Melbourne atangin darkar khat thlawhnain kan kal a. South Australia State a lo ni tawh a, sana pawh Melbourne aiin darkar chanvein kan herh hma leh a. University of South Australia-ah Mr. Chris-a te chhungkuain min lo dawngsawnga an fel khawp mai. University of South Australia-a School of Pharmacy tlawhin an B.Pharm syllabus-te leh an research neih dante chipchiar takin kan hmu a, a hlawkthlak hle mai.

Adelaide-ah hian damdawi dawrte tlawhin, prescription an hman dan te, damlo hnena damdawi an pek chhuah dan te chipchiar takin kan zir a, heng hi nakin lamah kan la sawi zau ang. Pharmacy Board of South Australia hotute nen inkawmhona tha tak mai kan nei bawk. Repatrach Hospital-ah kalin Hospital Pharmacy an tih dante chipchiar takin kan zir leh a, Pharmacist-te an thawkrimin an pawimawh hle mai.

Adelaide hi a faiin a thianghlim em em a, a khawpui chhunga lui luang tlang Torrents an tih chu a mawiin an chei nalh hle mai. Khawpui lian lutuk a ni lo nain lehkha zirna hmunpui tak niin ka hria. Tuifinriat a mawiin a lang pawl ruih mai a, tleirawl rualten sang tak tak atanga zuang thlain tuifinriata an hleuh kual velte hmuh a nuam hle a ni. Khawlai leh kawtthler khawilai hmun pawh a thianghlim hle a, bawlhlawh paih mai mai hmuh tur a awm lo va, motor tlanin horn an hmet ri ngai lo a, mihring an zalen hle bawkin a hriat a ni.

Sidney lam ve thung

Adelaide atangin Sydney hi karkar 2 lai thlawhnain kan kal leh a, Sydney hi chu a lo lum deuh a, a vawh lai berin 12/13°C vel a ni. A khua hi Melbourne leh Adelaide te ngaihtuah chuan a mihring an

tamin a pui zawk hle a ni. Sydney University kan tlawh nghal a, Prof. Paul Groundwater leh Prof. Roufogalis ten min lo dawngsawng a. An B.Pharm Course awm dan te, M.Pharm Course leh Ph.D. an tih dan te chipchiar takin kan zir a, an laboratory-te kan fangkualin a bengvarthlak hle mai.

Pharmaceutical Society of Australia hotute nen inkawmhona hun tha tak mai kan nei a. An hnathawh dan leh an mawhphurhnate fiah fai takin min entir a, an changtlungin an awhawm hle a ni. Mr. John Bell, Pharmaceutical Society of Australia President ni bawk, amaha Pharmacist private-a practice-na hmun (a damdawi dawr) te kan tlawh a, a ropui hle mai. Pharmacist rualin uluk tak mai a damlo te damdawi an pe a, counseling an nei vel han hmuh chuan an awhawm duh hle mai.

Sydney-a kan awm chhung hian Sydney vel tuipui kan fang a, a mawiin a nuam hle. Sydney opera, khawvel puma building mawi leh lar chipchiar takin kan fang a, Sydney tower atangin khawpui te kan thlir vel a, a mawi thei hle.

Singapore lam ve thung

Sydney atanga darkar 5 zet kan thlawh hnuin Singapore kan thleng a, Equator tan tlang a ni bawk a, a lo lum hle mai. National University of Singapore (NUS)-ah hun tam ber kan hmang a, an B.Pharm, M.Pharm leh Ph.D course-te kan zirchiang a, a phurawm thei khawp mai. Singapore-ah hi chuan Australia lam aiin an syllabus-te pawh industry lam a tel tam deuh a, mahse Australia ang thovin Pharmacist chu Clinical Practice lam a ni tlangpui. Singapore Pharmacy Board-te nen Ministry of Health Conference Room-ah meeting kan nei a, an hna thawh dan tlangpuite kan ngaithla bawk.

Australia-a Pharmacy Course

Pharmacy hi B.Pharm, M.Pharm leh Ph.D te a zir theih a, Monash University-ah chuan B.Sc (Pharmacy) pawh an zir thei bawk a, mahse Pharmacy practice tur chuan B.Sc (Pharmacy) degree tan a theih loh a ni. Monash University, University of South Australia leh Sydney University-ah te an course a inang tlangpui deuh a, an syllabus zawng zawnga 80% hi chu Clinical practice/Pharmacy practice a ni ber mai. Sydney Univerity-ah hian industry lampang kaihhnawih research Post Graduate leh Ph.D level-ah an bei nasa em em bawk. Zirlai kan hmuh theih ho chin an serious em em a, lehkha chhiar mawlh mawlh ka hmu tam hle.

Pharmacy practice dan tlangpui

B.Pharm pass zawh hnuah Pharmacist hna thawka practice tur chuan kum khat dang internship tih leh a ngai a, hetih lai hian damdawi dawr leh hospital-ah te Pharmacist puitling kaihhruainain an thawk thin. Internship an zawh hnu chuan an awmna State tin khan a hrangin exam an buatsaih a, chu exam-a an pass hnu chuan Registered Pharmacist an ni thei ta a, anmahniin an practice ve thei tawh a ni. Amaherawhchu, Registered Pharmacist-te pawhin kum hnih danah an registration renew a ngai a, renew tur hian a

hranpain exam an neih zel a ngai bawk. Mahse, an State Pharmacy Board theuh khan Refresher Course regular takin an buatsaih thin a ni. An tih dan hi state hrang hrangah a inang vek a ni.

Damdawi pek chhuah dan

A tlangpuiin doctor-in damlo a en hnua a prescription ziah chu Pharmacist-in uluk takin a en hmasa a, prescription-ah damdawi inhal a awm em? Chak lutuk a awm em? Damdawi ziah nawn a awm em? tih te an check thin a. Chumi zawhah damlo hmuin a damdawi lo ei thin tawh te, a chaw ei dan te, a nun dan tlangpui te zawtin damlo medication history chu uluk takin a zawt thin. Heng zawng zawng a zawh fel hnu hian prescription kha tihdanglam ngai a awm a nih chuan Doctor/Physician hnenah rawtna nen a thawn let leh a, Doctor-in siamthat ngai laite a lo siamtha leh thin. Heng zawh hnu hian Pharmacist chuan damlo kha counseling a nei ta a, a damdawi ei dan tur, a side effect, adverse effect leh a dang thil tulte a hrilh hnuah chauh damdawi a pe thin.

Damdawi burte hi Pharmacist lo chuan an khawih ngai lo va. Damlo mamawh tawk ang chiah kha damdawi bur atanga la chhuakin a pack-na bikah damlo mamawh tur a pack vek a, aluminum foil-a tuam lehin damlo a pe thin. He an pack-na hi bhister packing a ni a, a pawn lamah chiangkuang takin a ei hun tur leh ei dan tur, damlo hming, Pharmacist hming leh Doctor hmingte a chuang a ni. Hei hi damdawi dawr leh hospital-a an practice dan a ni a, hospital bikah chuan Doctor-in damlo awmna a fan kual hian Pharmacist-te nen an fangkual thin.

Keini aiin hnufumna an nei em?

Australia hi an thil tih dan a changkang viau nain Australia ram pumpui hian keini India-a Pharmacy Council of India kan nei ang hian ram pum huapin an lo la inzawmkhawm lo a. Anmahni state tinin State Pharmacy Board an lo nei hrang a, state tinah hian Registration dan leh renew dan te an nei hrang tlangpui. Ram pum huapa Council Board neih ve tul an ti em em a, 2010 July thla atangin Australia pumpuiin Council pakhat an nei tawh dawn chauh a ni. Hemi kawngah hi chuan India hi kan ngaihsanawm ve hlein ka hria.

Australia leh Singapore kan kalnate hi a mawiin a fai hle mai a, bawlhhlawh leh hnawmhnawk paih hmuh tur a awm meuh lo. Ka'n sawi tel hram duh chu inthiarna (toilet) a faiin a thianghlim thei hle; mihring changkanna a tilang thui khawpin ka hria. Khawlai velah police duty an awm ngai mang lo tih theih a ni, a ralmuang riauin ka hre bawk.

Heng kan zinna report-te hi uluk taka kan siam zawh hnuin Govt of India-ah a tul anga hma lak zui turin report kan theh lut ta a ni. He kan zinna hi ka hlawkpui hle mai a, tam tak chu kan state-ah pawh keimahniin hma kan lak ve mai theih a tam hlein ka hria.

DRUGS INTERACTION AND ADVERSE REACTIONS

ANTI-MICROBIAL DRUGS

1. PENICILLINS
   Eg: 1) Benzyl Penicillin (Penicillin G)
   2) Procaine Penicillin
   3) Benzathine Penicillin
   4) Phenoxymethyl Penicillin (Penicillin V)

   (a) Allupurinol nena pek kawpin vun durh a thlen thei.
   (b) Neomycin nena ei kawpin Penicillin-V hnathawh a titlem thei.
   (c) Methotrexate nena ei kawpin methotrexate excretion a tihniama, chu chuan methotrexate toxicity a tisang.
   (d) Guar Gum hian Penicillin-V absorbtion a titlem.
   (e) Oral Contraceptive-te nena pek kawp hian Contraceptive-te hnathawh a titlem.
   (f) Probenecid hian Penicillin excretion a titlema, toxicity a tihniam thei.

2. MACROLIDES ANTIBIOTICS
   Eg: a) Azithromycin
   b) Erythromycin & its derivatives
   c) Clarithromycin
   d) Roxythromycin

   1) Digoxin leh Cyclosporins derivative te absorbtion a tisang thut thei.
   2) Triazolam, Carbamazepine leh Phenytoin te hnathawh a tisang.
   3) Terfenadine metabolism a block thei a, hei hian arrhythmia te a thlen thei bawk. Hman kawp loh hrim hrim tur.
   4) Bromocriptine leh Cabergoline Concentration taksaah a tisang vak thei.
   5) Ergotamine leh Ergometrine te nena hman kawp a nih chuan Ergotism an thlen nghal thin. Hman kawp loh tur.
   6) Itraconazole concentration an tisang thei.

7) Clarithromycin leh Erythromycin te hian Pimozide te nena pek kawp chuan Arrhythmia an thlen thei a. Erythromycin bik hi Clozapine nena pek kawp chuan Convulsion an thlen thei a ni.
8) Antivirals (Zidovudine, Ritonavir) te absorption an tihniam thei a, hei hian antiviral te side effect an tisang thei.
9) Midazolam hi Erythromycin leh Clarithromycin ten a metabolism an tihniamin taksaa concentration an tisang thin a, hei hian zawina namen lo (profound sedation) a thlen thei a ni.
10) Erythromycin bik hian methylprednisolone leh a dang corticosteriod te concentration a tisang.
11) Cimetidine in Erythromycin Concentration taksaah a tisang a, chu chuan Erythromycin toxicity a tisang.
12) Anti-Congulants hnathawh an tichak a, thipût hial a thlen thei.
13) Antidepressant damdawi pakhat reboxetine siam te chuan hman kawp loh turin thurawn an pe.
14) Ergotamine nena hman kawpin artery a affect thei a, chu chuan Ischemia a thlen hial thei.

3. CEFADROXIL (Cephalosporin antimicrobial)
   1) Furosemide nena hman kawp hian nephrotoxicity a thlen hma bik.
   2) Anti-coagulants (eg: Warfarin, etc) te hnathawh a tichak a, thipût a thlen hial thei.
   3) Ulcer damdawi H2- receptor antagonists (eg Cimetidine, Ranitidine) te hian Cefadroxil absorption an tihniam a, a toxicity a tisang.
   4) Probenecid-in taksa atanga excretion a tihniam a, Cefadroxil toxicity a tisang.

4. CEFOTAXIME (Third Generation Cephalosporin)
   1) Aminoglycosides (eg: Streptomycin, Kanamycin, Gentamicin, Tobramycin, etc) ten a hnathawh (action) an tichak.
   2) Loop Diuretic (Frusemide) ten nephrotoxicity an tisang thei.
   3) Probenecid hian a excretion a tihniam a, a toxicity a tisang.
      Special precaution: Hengte hnenah hian pek loh ni se – Kal (kidney) lam tha lo, raipuar leh nu hnute tui pe lai.

5. CEPHALEXIN (First generation Cephalosporin)
   1) Aminoglycoside (Streptomycin, Kanamycin, etc) ten a hnathawh an tichak.
   2) Probenecid hian excretion a tihniam a, a toxicity a tisang.
   3) Loop Diuretics (Frusemide) ten nephrotoxicity an tisang thei.

6. CHLORAMPHENICOL
   a) Rifampicin hian metabolism a tichak a, ei pawhin a hnathawh a tinep.
   b) Warfarin hnathawh a tichak a, thipût a thlentir hial thei.
   c) Paracetamol hian Chloramphenicol metabolism a tibuai thei a, a toxicity a tisang bawk.
   d) Mannitol leh Hydrochlorthiazide te hian Chloramphenicol excretion an tichak a, a hnathawh an tihniam.
   e) Phenibarbital hian Chloramphenicol plasma concentration a tihniam.
   f) Penicillin-te hnathawh an tichak lo thei.
   g) Amitryptyline, Imipramine, Desipramine te toxicity a san phahin an adverse effect a tisang thei.
   Special Precaution: Nu, rai lai leh hnute pe laiah pek loh nise.

7. CO-TRIM OXAZOLE
   a) Pyrimethamine nena pek kawp hian megaloblastic anaemia an thlen thei.
   b) Warfarin nena pek kawpin Warfarin hnathawh a tisang a, thipût hial a thlen thei.
   c) Cyclosporins nena pek kawpin nephrotoxicity a siam thei a, renal transplantation lo ti tawhte phei chu pek hauh loh tur.
   d) Oral Contraceptive nena pekin Contraceptive hnathawh kha a titawp thei.
   e) Amiodarone nena pek kawp hian arrhythmia a thlen thei.
   f) Phenytoin plasma Concentration a tisang thei.
   g) Methotrexate nena pek kawpin anti-foliate effect a tisang thei.
   Special Precaution: Naupai lai leh kum upa lamah te a theih chuan prescribe loh nise.

8. TETRACYCLINE
   a) Penicillin activity a tichak lo thei.
   b) Antacid-te nena pek kawpin Tetracycline absorption a hniam thei.
   c) Phenindione (anti-coagulants)-in Tetracycline hnathawh a tichak lo.
   d) Anti-epileptic (Carbamazepine, Phenobarbital, Phenytoin) te hian tetracycline metabolism an tichak a, a hnathawh an titlem.
   e) Calcium, Aluminium, Iron te hian Tetracycline nen complex an siam a, an hnathawh an intichak lo tawn emaw, hnathawk thei lovin an insiam thei.
   f) Cyclosporin plasma concentration an tisang thut thei.
   g) Ergotamine leh Ergometrine te tetracycline nena pek kawpin Ergotism an thlen hma bik.
   h) Oral Contraceptive nena ei kawp hian Contraceptive hnathawh an tichak lo thei.

i) Sucralfate hian Tetracycline absorption a tihniam thei.
Special Precaution: Nu, naupai laia pekin nau thang lai ruh insiam a tichhe thei a, ha eng a thlen thei bawk.

14. NORFLOXACIN
a) Cyclosporin emaw, theophylline emaw nena hman kawpin taksaa an level a tisang thut thei.
b) Warfarin hnathawh a tisang thut thei.
c) Probenecid nena hmankawpin Norfloxacin excretion a titlem.
d) Antacid nena hmankawpin Norfloxacin absorption a titlem.

ANTI-MALARIAL

1. CHLOROQUINE
a) Antacid-in Chloroquine absorption an titlem thei.
b) Amiodarone nena hman kawpin ventricular arrhythmia a thlen thei a, hman kawp loh tur.
c) Malaria damdawi tho Mefloquine nena hman kawpin Convulsion a thlen thei.
d) Digoxin plasma concentration a tisang thei.
e) Cyclosporin nena hman kawp hian Cyclosporin toxicity a tisang bik.
f) Cimetidine nena hman kawp hian Chloroquine metabolism a timuang thei, hei vang hian darkar 4 tala inhlata pek (administer) tur a ni.
g) Quinacrine nena hman pawlhin vunah allergy a thlen thei.
h) Phenylbutazone nena hman pawlhin vunah allergy a thlen thei.
i) Pyridostigmine emaw, Neostigmine nena hman pawlhin an hnathawh an intichhe tawn (antagonise) thin.
Special Precaution: Naupai, nu nau hnutetui pelai, thin lam leh kal lam na (hepatic/renal impairment), Kaih/Phungzawl ching leh naupangah hman loh tur.

2. PRIMAQUINE
a) Mepacrine nena hman pawlhin Primaquine plasma concentration a sang thut a, a toxicity a tizual.
b) Chloroquine metabolism a dang thei.
c) Sulfonamides, Nitrofurans, Methotrexate, Phenylbutazone leh Chloramphenicol te nen hman pawlh hauh loh tur.

3. MEFLOQUINE
a) Chloroquine leh Quinine nena hman pawlhin Convulsion an thlen thei a. (Case pawimawh bikah chuan Supervise-na nen Quinine IV an pe tel bawk).

b) Calcium Channel blocker (Verapamil) nena hman pawlhin thinphu an timuang (Bradycardia) thei.
c) Pimozide nena hman pawlh hian Ventricular arrhythmia an thlen thei.
d) Digoxin nena hman pawlhin thinphu an timuang thei (Bradycardia).

4. QUININE
   a) Digoxin toxicity a tisang vak thei.
   b) Warfarin action a tichak thei.
   c) Cimetidine-in a Quinine metabolism a tihniam thei.
   d) Pimozide, Amiodarine, Terfenadine hman pawlhin ventricular arrhythmia a thlen sam bik. Hman pawlh loh hrim hrim tur.

5. ARTESUNATE
   a) Tetracycline nena hman pawlh hian anti-malarial properties a tichak nia hriat a ni.
   b) Mefloquine leh Primaquine nena hman pawlhin a hnathawh a tichak.
   c) Sulfonamides leh Pyrimethamine te nen an hnathawh an intichhe tawn.

CONTRACEPTIVE ORAL

(Progestogen, Oestrogens, Combined Oestrogens and Progestogens)

a) Rifampicin hian Combined oral contraceptives leh Progesteron metabolism a tichakin an contraceptive effect a titlem.
b) Ampicillin, Tetracycline te hian Combined oral contraceptive effect a titlem thei.
c) Warfarin, Acenocimarol leh Phenindione te nen an hnathawh an intichhe tawn (antagonism).
d) Tricyclic antidepressant (Imipramine, Amitriptyline etc) te side effect a thlen rang bik.
e) Antiepileptic (Carbamazepine, Oxcarbazepine, Phenobarbital, Phenytoin, primidone leh topiramate) te metabolism an tichak a, Combined leh Progesterone chauh tel Oral Contraceptive te hnathawh an titlem thei bawk.
f) Fluconazole, Itraconazole, Ketoconazole te hi oral Contraceptive nena hman pawlhin Contraceptive hnathawh an tibo (failure) thei.
g) Oral Contraceptive leh anti-hypertensive te hman pawlh hian anti-hypertensive hnathawh a tithuanawp thei.
h) Oral Contraceptive te hian Cyclosporin Plasma Concentration an tisang a, Cyclosporin Side effect an tisang thei.

i) Lansoprazole hian Oral Contraceptive te metabolism a tichak a, an hnathawh a titlem thei.
j) Diuretic te hnathawh hi Combined oral contraceptive ho hian a tichhe (antagonise) thei.

ANTI-ALLERGIC DRUGS

1. CETIRIZINE
   a) Zu (Alcohol) nena hman kawpin CNS depression a tizual vak thei.
   Adverse effect: Luna (headache), luhai, zawina, kam chhung ro, pum nuam lo te a thlen thei a, naupai lai leh hnathawk mental alertness ngai chite pek loh tur. Kal lam tha lo tan a hlauhawm zual bik.

2. CHLORPHENIRAMINE MALEATE
   a) Zu (alcohol) nena hman kawpin a sedative action a tizual vak thei.
   b) Psychotropic drugs (eg: Chlorpromazine, reserpine, haloperidol) te nena hman kawp hian mi a tichau vak thei.

3. DIPHENHYDRAMINE
   a) Zu nena hman kawpin CNS depression a tizual vak thei.
   b) Barbiturate te nena hman kawpin CNS depression a sang vak thei a, damlo chau tawhte chuan an chhiatpui hlen thei.
   c) MAO Inhibitors (Phenelzine, Isocarboxazide), Atropine te, Amitriptyline te nena hman pawlh hian anti-muscarinic action a tisang vak thei.
   d) Amphotericine, hydrocortisone leh sodium succinate te nen a inhal thei.

4. FEXOFENADINE
   a) Zu nena hman kawpin mi a tichau thei.
   b) Antacid nena hman kawpin Fexofenadine absorption a tihniam thei.
   c) Ketoconazole emaw, erythromycin emaw nena hman kawp hian taksa a Fexofenadine plasma level a tisang thei.

5. PHENIRAMINE MALEATE
   a) Zu nena hman kawp hian mi a tichau vak thei.
   b) Barbiturate te nena hman kawpin mi a tichau thei bawk.
   c) Phenelzine, Isocarboxazide, Iproniazid, Atropine, Amitriptyline te nena hman kawpin anti-muscarinic effect a tisang thut thei.
   d) Aminoglycoside antibiotics te nena hman pawlhin toxicity effect a tihniam.

6. PROMETHAZINE
   a) Zu, Barbiturate leh Opoid analgesic te nena hman kawpin mi a tichau vak thei.
   b) Aminoglycoside antibiotics te nena hman pawlhin Ototoxicity a tihniam.
   c) Hydroxyzine-in a hnathawh a tihniam thei.
   d) Pethidine te na chhawk theihna a tihniam.
   e) Chloramphenicol, Phenobarbital, hydrocortisone, thiopental leh heparin te nen incompatible an ni a, hman kawp loh a him ber.
   f) Chlorthiazide, Aminophylline te nen precipitation an siam thei.

7. TERFENADINE
   a) Grape juice te nen ei kawp loh tur, terfenadine level taksaah a tisang thut thei.
   b) Zu nena ei kawpin mi a tichau thei.
   c) Amiodarone nena ei kawpin Anti-arrhythmia a thlen thei.
   d) Clarithromycin leh Erythromycin te hian Terfenedine metabolism an tidanglam thei. (A ei emaw, hnawih topical preparation pawh hman kawp loh hrim hrim tur)
   e) Imidazole leh Triazole te nen hman pawlh loh tur.
   f) Quinine nena hman pawlh hian ventricular arrhythmia a thlen thei.
   g) Sotalol nena hman kawp hian Ventricular arrhythmia a thlen thei.
   h) Diuretic ho nena hman pawlh hian hypokalemia an thlen nasa bik a, Ventricular arrhythmia an thlen thei bawk.

ANTI-TUSSIVES

1. CODEINE PHOSPHATE
   a) CNS depressant dangte leh zu nena pek kawp hauh loh tur a ni, mi a tichau vak thei.

2. DEXTROMETHORPHAN
   a) Phenelzine nena hman kawp hian hypotension a siam a, Coma hial a thlen thei.

3. EPHEDRINE
   a) Phenelzine, Isocarbazide te nena hman pawlhin blood pressure a tisang thut thei a, hei hian B.P. hniamin zui lehin taksa tan a hlauhawm thei.
   b) Adrenergic neurone blockers (eg Guanethedine) nena pek pawlhin hypertension a siam thei.

NSAIDS

1. ANALGIAN
   1) Naupang (nausen) thla 3 aia tlem/kg 5 aia zângah pek loh tur.
   2) Cyclosporin level a tihniam thei.

   Adverse effect:
   1) Agranulocytosis(a symptom complex characterized by a marked decrease in the number of granulocytes and by lesions of the throat, and other mucous membranes of the gastrointestrial and of the skin.
   2) Rapid injection-ah B.P. a tihniam thut thei.
   3) Pum lam natna (gastric symptoms) a thlen thei.
   4) Hypersensitivity (Skin etc) a thlen thei.

2. ASPIRIN (Acetylsalicylic Acid)
   1) ACE inhibitors (eg: Captopril, Ramipril, Lisinopril, etc) te hian Aspirin (in doses over 300 mg daily) nena hman pawlhin renal impairment a thlen thei a, chu chuan ACE inhibitors te hnathawh (hypotensive effect) te a tibo thei.
   2) Kaolin (absorbents) hian Aspirin Absorption a tihniam thei.
   3) Ibuprofen hian aspirin antiplatelet effect a tihniam thei.
   4) Angiotensin Receptor Antagonists (eg: Saralasin, Losartan, etc) te hi aspirin (in doses over 300 mg daily) nena pekin renal impairment a thlen thei a, hypotensive effect pawh a tibo thei.
   5) Anti congulants (Coumarins, Warfarin, Phenindione) te effect hi Aspirin-in a tichak sawt thei (Increased risk of bleeding due to antiplatelet effect).
   6) Antidepressants (eg: Venlafaxine, fluoxetine, citalopram, etc) te hi Aspirin nena pek kawpin thisen khang hun a titlai a, thisen chhuak a tawp lawk thei lo thin.
   7) Aspirin hian Antiepileptics (eg: Phenytoin, Valproate, etc) te hnathawh a tichak sawt.
   8) Aspirin te hian methotrexate (anti- cancer drug) te taksa atanga paihchhuah (excretion) a titlem a, chuvangin risk of toxicity a tisang sawt.
   9) Aspirin hian diuretics (eg Spironolactone) te hnathawh a tibo vek thei.
   10) Aspirin hian Probenecid (antigout i.e. ruhseh chi khat damdawi) hnathawh a tibo vek thei.
   11) Zu (alcohol) hian Gastric ulceration a thlen hma.
   12) Metoclopromide (antiemetics) hian Aspirin level a tisang thei.

   Side effect: Ulceration bleeding, gastric erosion, urticaria (vun thak, bawl, durh leh vual chi hrang hrang/ei sual/ huat). Rhinitis (hnarkaw-na), Prolonged bleeding time (thikhang har), epigastric discomfort (dul chung pangti na, awm tinuam lo)

   Instruction: Pum ruak loa ei tur.

3. PARACETAMOL
   1) Paracetamol hian zu ngawlveiah hian thin a tichhe hma em em bik a ni.
   2) Anticoagulants ho hnathawh a tichak sawt thei (eg; Coumarins).
   3) Paracetamol hian Cancer damdawi chi khat Busulfan (Intravenous) hnathawh tur a timumal lo.
   4) Domperidone (antiemetics, anti-nauseants, anti-ulcers) hian Paracetamol absorption a tichak sawt.
   5) Colestyramine (Lipid regulating drugs) te hian Paracetamol absorption a timuang sawt.
   6) Metoclopramide hian Paracetamol absorption a tichak sawt thei.
   7) Pethidine, Propantheline te hian Paracetamol absorbtion a tihniam sawt.

   Adverse effects:

   Paracetamol hian khawsik, neutropenia (thisen var (WBC) zinga group pakhat a titlem) thrombocytopenia (platelet (thisen tikhangtu) tlem vanga thi chhuak /pût/khang/khar thei lo) anaemia (taksa a thisen tam tawk lohna) a thlen thei.

4. DICLOFENAC
   a) ACE inhibitors (eg: Captopril, Ramipril, Lisinopril, etc) te hian diclofenac (in doses over 300 mg daily) nena hman pawlhin renal impairment a thlen thei a, chu chuan ACE inhibitors te hnathawh (hypotensive effect) te a tibo thei.
   b) Quinolones nena pekin Diclofenac hian convulsion (kaih) a thlen thei.
   c) Diclofenac hian Clonidine, Diazoxide, Hydralazine, Minoxidil, Nitroprusside methyl dopa, Nitrates (thisen sang damdawi) hnathawh a tibo vek thei.
   d) Diclofenac hian anticongulant (coumarins) hnathawh a tichak sawt thei, mahse risk of bleeding a tisang thei hle.
   e) Phenindione nen hian diclofenac (Intravenous) hi pek kawp theih a ni lo a, a chhan chu risk of haemorrhage a sang thei a ni.
   f) Cylosporin hian diclofenac plasma cancer a tisang thei.
   g) Cancer damdawi (methotrexate) risk of toxicity hi Diclofenac hian a tisang sawt thei.
   h) Diclofenac hi Sibutramine nena pek hian risk of bleeding a tisang sawt thei.

5. IBUPROFEN
   a) ACE inhibitors (eg: Captopril, Ramipril, Lisinopril, etc) te hian Ibuprofen (in doses over 300 mg daily) nena hman pawlhin renal impairment a thlen thei a, chu chuan ACE inhibitors te hnathawh (hypotensive effect) te a tibo thei.
   b) Diclofenac hian thisen sang damdawi (Clonidine, Diazoxide, Hydralazine, Minoxidil, Nitro-prusside methyl dopa, Nitrates) hnathawh a tibo vek thei.

c) Diclofenac hian anticoagulant (coumarins) hnathawh a tichak sawt thei, mahse risk of bleeding a tisang thei hle.
d) Ibuprofen hi Tacrolimus nena pek kawpin risk of nephrotoxicity a sang sawt thei.
e) Cylosporin hian diclofenac plasma cancer a tisang thei.
f) Lithium nena pek kawpin Ibuprofen hian risk of Lithium toxicity a tisang thei. (Due to de-creased in lithium excretion)
g) Mifepristone (abortifacient) hi Ibuprofen (or any NSAID) nen eikawp loh tur.
h) Diuretics nena pek kawpin risk of nephrotoxicity a tisang thei.
i) Aspirin leh Ibuprofen pek kawp loh tur, a chhan chu aspirin hian Ibuprofen thisena a binding site atangin a luahlan thei a ni.

6. NIMESULIDE
   a) Nimesulide hian methotrexate (anti-cancer drug) hi taksaa a binding site atangin a luahlan (displace) thei a ni.
   b) Nimesulide hian diuretics (i.e. Frusemide) hnathawh a titlem sawt.
   c) Fenofibrate (Lipid regulating drugs), salicylic acid, valproic acid (anti epileptic drug) te hian Nimesulide hnathawh an tihniam thei.
   d) Theophylline (Bronchodilator) hi Nimesulide nena pek kawpin Theophylline hnathawh tur ang a titlem sawt thin.

7. MEFENAMIC ACID
   a) Mefenamic acid hian anticongulants (eg: Coumarins) te hnathawh a tichak sawt thei.
   b) Mefenamic acid hi corticosteroids nena pek kawpin gastro-intestinal bleeding leh ulceration a titam sawt thei a ni.
   c) Antidepressants (eg: Venlafaxine) leh Mefenamic acid pek kawp hian risk of bleeding a sang sawt thei.
   d) Antihypertensive drugs (clonidine, hydralazine, minoxidil, nitroprusside, diazoxide, calcium-channel blockers) te hnathawh hi mefenamic acid hian a tibo vek thei a ni.
   e) Mefenamic acid te hian Lithium taksa atanga paih chhuah (excretion) a timuang a, taksaak Lithium a chhek khawm thei a, risk of toxicity a sang sawt thin.

8. MORPHINE
   a) Zu nena pek kawpin Morphine hian nasa zawkin hna a thawk thei.
   b) MAO Inhibitors (eg Phenelzine, Tranylcypromine, Isocarboxazide) te hian Morphine hnathawh an tichak sawt thei.

d) CNS depressants (Imipramine Doxepin, Amitriptyline) te hian Morphine hnathawh an pui thei.
e) Ulcer healing Drugs (eg Cimetidine) te hian Morphine metabolism an inhibit thei a ni.
f) Diuretics hnathawh Morphine hian a tibo vek thei.

ANTI-ULCER (Ulcer healing drugs)

1. CIMETIDINE
   a) Cimetidine hian Analgesics (azapropazone) plasma concentration hi a tisang thei.
   b) Cimetidine hian Opoid analgesics (e:g Morphine, Pethidine, etc) te plasma concentration a tisang vak thei.
   c) Cimetidine hian amiodarone, procainamide, propafenone, quinidine, flecainide, Lidocaine te plasma concentration nasa takin a tisang thei.
   d) Cimetidine hian taksain Cefpodoxine a lo hman tangkaina (absorption) a tihniam.
   e) Cimetidine hian Ecythromycin, metronidazole te plasma concentration a tisang thei.
   f) Cimetidine hnathawh hi Rifampicin hian a titlem sawt thei.
   g) Cimetidine hian anticongulant (coumarins) te hnathawh a tichak sawt thin.
   h) Cimetidine hian antidepressants (mirtazapine, sertraline, amitriptyline, doxepin, Imipramine, nortriptyline miclobenide, tricyclics) te plasma concentration a tisang sawt thei a ni.
   i) Cimetidine hian metformin leh Sulphonylureas te hnathawh nasa takin a tichak thei.
   j) Cimetidine hian Carbamazepine, Phenytoin, Valproate (antiepileptics) te hnathawh a pui thei.
   k) Cimetidine hian chloroquine , hydroxychloroquine leh quinine te hnathawh a tichak sawt thei.
   l) Antipsychotics (Chlorpromazine, clozapine) te hi cimetidine nena pek kawpin an thawk chak sawt thei.
   m) Sertindole leh Cimetidine pek kawp hian Ventricular arrhythmias nasa takin a thlentir thei a, chuvangin pek kawp loh tur.
   n) Antivirals (eg: amprenavir, zalcitabine) te hian cimetidine hnathawh an tichak sawt.
   o) Anxiolytics & Hypnotics (Benzodiazepines, Clomethiazole, Zaleplon te hnathawh hi cimetidine hian a tichak zual thei.
   p) Ergotamine leh methylsergide te hi cimetidine nen pek kawp loh tur, pek kawp chuan ergotism a thlen thei.

2. OMEPRAZOLE/LANSOPRAZOLE/PANTOPRAZOLE
   a) Omeprazole leh Lansoprazole te hian Cilostazol (peripheral & cerebral vasodilators) plasma concentration a tisang thei a, chuvangin risk of toxicity a san theih avangin eikawp loh tur a ni.
   b) Valdecoxib (NSAID) hian Omeprazole hnathawh a tichak sawt thei.
   c) Omeprazole hian antiepileptic drug (Phenytion) hnathawh a tichak sawt thei.
   d) Omeprazole leh clarithromycin te hi pek kawp hian an hnathawh tur aia thain an thawk ve ve thei a, an inpui tawn a ni.
   e) Voriconazole (antifungal) hian Omeprazole hnathawh a pui thei.
   f) Omeprazole hian Diazepam hnathawh a tithain a tirei sawt thei.
   g) Omeprazole hian tacrolimus (immunosuppressant) leh cylosporin (Immuno suppresant) te hnathawh a tichak sawt thei.
   h) Omeprazole hian anticancer drug (methotrexate) taksa atanga paih chhuah a titlem a, chuvangin risk of toxicity a tam sawt a, pek kawp loh a tha.
   i) Lansoprazole absorption hi sucralfate hian nasa takin a tihniam thei.
   j) Antacid te hian Lansoprazole absorption a titlem thei.

3. SUCRALFATE
   a) Sucralfate hian antibacterials (ciprofloxacin, levofloxacin, mixifloxacin, norfloxacin, ofloxacin & tetracyclines) te absorbtion a titlem.
   b) Sucralfate hian anticoagulant (Coumarine) te hnathawh a titlem.
   c) Sucralfate hian antiepileptic drug (phenytoin) hnathawh a titlem thei.
   d) Sucralfate hian antifungal (ketoconazole) te hnathawh a titlem (reduce the absorption).
   e) Sucralfate hian Antipsychotics (Sulpiride), Cardiac glycosides, Levothyroxine (thyroxine) leh ulcer healing drug (lansoprazole) te hnathawh a titlem (reduce the absorption).

4. RANITIDINE
   a) Ranitidine hian antifungals (itraconazole leh ketonazole) te hnathawh a titlem thei.
   b) Ranitidine hian tetracycline hnathawh a titlem sawt thei.
   c) Ranitidine hian antibacterial (Cefpodoxime) hnathawh a titlem sawt thei.
   d) Antacid hian Ranitidine hna thawh dan tur dik tak a tihniam thei.

5. CISAPRIDE
   a) Cisapride hi diazepam nena pek kawpin nasa leh zualin hna a thawk thei.
   b) Benzodiazepines leh alcohol te hian cisapride nena pek kawpin nasa lehzualin hna an thawk thei.

c) Anti coagulant (eg: coumarin) te hnathawh nasa takin cisapride hian a pui a ni.
d) Cisapride hian Ranitidine leh Cimetidine te absorption nasa takin a pui a ni.
e) Anti convulsants te nena pek kawpin cisapride hian effect a neih theih avangin anticonvulsant (eg: Phenytoin) te hi uluk taka monitor tur a ni.
f) Cisapride leh 1) antiallergics, 2) antibacterials, 3)antidepressants, 4)anti-fungals, 5) antinauseants, 6)Antipsychotics leh 7) protease inhibitors te hi pek kawp loh tur.
g) Cisapride hnathawh hi anti-cholinergic drug (eg: Atropine, Hyoscine, Dicyclomine) hnathawh a tibo vek thei.

6. DOMPERIDONE
a) Domperidone hnathawh hi Opoid analgesics (eg: Morphine, Pethidine, etc) te hian an tibo vek thei a ni.
b) Domperidone hian Paracetamol hnathawh (absorption) a tichak sawt thei.
c) Antimuscarinics (eg: Atropine, Dicyclomine, Hyoscine, etc) te hian Domperidone hnathawh an tibo vek thei a ni.
d) Domperidone leh Amantadine te hi pek kawpin extrapyramidal Reactions, Parkinsonism, Akathesia (awm hlehle theih lohna), acute dystonic, Tardive dyskinesia te hi a thleng thei a ni.

ANTIEMETIC DRUGS

1. MECLOZINE
a) Meclozine hian alcohol, barbiturates, hypnotics, opoid analgesics, sedative and neuroleptics te hnathawh, a bik takin CNS depressant an nihna kawngah nasa takin a pui thei a ni.
b) Atropine, tricyclic anti depressants leh MAO inhibitors te hnathawh nasa takin a pui thei.
c) Ototoxicity aminoglycosides-in a thlen theih thin hi Meclozine hian a dang thei a ni.
Side effect: CNS depression, khawhmuh fiah lohna, dang rona, zun harsatna, êk khal, thisen hniam, luhai, lu na, luakchhuak, beng kiu vung vung (tinnitus).

2. CINNARIZINE
a) Alcohol nena eikawpin Cinnarizine hian CNS depressant effect a tisang sawt thei.
b) Domperidone hnathawh (effect) a tichak sawt thei.

3. BETAHISTINE (anti-emetics and antinauseants)
   a) Anti-histamines hnathawh reng reng hi Betahistine hian a tibo vek thei.

HYPNOTIC AND ANXIOLYTICS
(Benzodiazepines) (Diazepam, Nitrazepam, Alprazolam, Oxazepam, Lorazepam, Chlordiazepoxide, Flurazepam, Clonazepam)

a) ACE inhibitors (eg: Captopril, Ramipril, Lisinopril, etc) te hnathawh (hypotensive effect) hi Benzodiazepines te hian an tichak sawt thei a ni.
b) Alcohol (Zu) nena pek kawpin Benzodiazepines te hian mut tihchhuahna leh zawina (sedation) a tisang thei a ni.
c) General anaesthetics te hnathawh hi Benzodiazepines te hian nasa takin a tisangin a tichak sawt thei.
d) Opoid analgesics (eg: Morphine, Pethidine) te hnathawh hi Benzodiazepines te hian nasa takin a tisang thei.
e) Angiotensin Receptor antagonists (eg: Saralasin) te hypotensive effect hi Benzodiazepines te hian nasa takin an puibawm thei a ni.
f) Rifampicin te hian Benzodiazepines te plasma concentration a tihniamin metabolism a tisang thei a, hei vang hian pek kawp loh tur.
g) Isoniazid hian Diazepam metabolism a titawp a ni.
h) Benzodiazepines te hian antiepileptics (eg: Phenytoin, Carbamazepine, Primidone) te hnathawh a tisangin emaw a tihniam thei.
i) Benzodiazepines te hi antihistamines te nena pek kawp hian Sedative effect a sang sawt thei a ni.
j) Antipsychotics te hi Benzodiazepines te nena pek kawpin Sedative effect a sang sawt thei.
k) Diazepam hian a bik takin Zotepine (antipsychotic) hnathawh nasa takin a pui thei.
l) Amprenavir (antivirals) te hi Benzodiazepines nena pek kawp hian mutchhuak tam lutuk leh Respiratory depression a sang thei em em a, chuvangin pek kawp loh tur a ni.
m) Ritonavir (antiviral) te hian Benzodiazepines te plasma concentration a tisang thei a, hei hian mutchhuak tam lutuk leh respiratory depression te a tisang thei.
n) Alprazolam hi indinavir (antiviral) nen pek kawp loh tur, a chhan chu mutchhuak tam lutuk leh respiratory depression a sang thei
o) Vasodilator antihypertensive (hydralazine, minoxidile, nitroprusside) te hi Benzodiazepines nena pek kawp hian hypotensive effect a sang sawt.

p) Cimetidine hian Benzodiazepines te metabolism a inhibit avangin plasma concentration a tisang sawt a, an hnathawh Cimetidine hian a tisang sawt thei.
q) Omeprazole leh esomeprazole hian diazepam hnathawh nasa takin an pui thei a ni.
r) Benzodiazepines te hian Muscle Relaxants (Baclofen or Tizanidine) te hnathawh (Sedative effect) nasa takin a pui a ni.

AMITRIPTYLINE (anti-depressant)

a) Alcohol hian Amitriptyline nena pek kawpin Sedative effect a tisang sawt thei.
b) NSAID, Tramadol te hi Amitriptyline nena pek kawpin plasma concentration a sang sawt a, CNS toxicity risk a sang sawt bawk.
c) Amitriptyline hian anticoagulant (Coumarin) hnathawh nasa takin a pui thei a ni.
d) Amitriptyline leh General Anaesthetics te pek kawp hian risk of arrhythmics (lungphu tha lo) leh hypotension (thisen hniam) a thlen thei a ni.
e) Amitriptyline hi amiodarone, disopyramide, quinidine, procainamide, flecainide, propafenine te nen hian pek kawp loh tur a ni, a chhan chu risk of arrhythmia a thlen theih avangin.
f) Moxifloxacin hi Amitriptyline nena pek kawpin Ventricular arrhythmia a thlen theih avangin pek kawp loh tur a ni. Rifampicin hian Amitriptyline hnathawh a titlem sawt thei bawk.
g) Amitriptyline hnathawh hi St. John's wort hian a tihniam thei.
h) Amitriptyline hian antiepileptics (eg: Primidone, Phenytoin) hnathawh a tibo vek thei. Tin, carbamazepine leh Phenytoin hian Amitriptyline Blood plasma concentration a tihniam thei.
i) Artemether/Lumefantrine (antimalarials) te hi Amitriptyline nen pek kawp loh tur.
j) Amitriptyline hian baclofen (muscle relaxant) hnathawh a tichak sawt thei.
k) Disulfuram hian amitriptyline hnathawh a tichak sawt thei.
l) Clonidine (antihypertensive) te hnathawh hi Amitriptyline hian a tihbo vek theih bakah Clonidine ei tawh loh hnuah thisen sang thawk-leh-khatah a thlen thut thei.
m) Amitriptyline hian Anxiolytics & Hypnotics (eg: Diazepam, alprazolam, Lorazepam, etc) te hnathawh (Sedative effect) nasa takin an pui thei.
n) Cimetidine hian Amitriptyline hnathawh nasa takin a pui thei.

ANTIHYPERTENSIVE DRUGS

Amlodipine/Nifedipine/Felodipine/Nicardipine (Calcium Channel Blockers(CCB))

a) CCB te hi ACE inhibitors (eg: Captopril, Ramipril & Lisinopril) te nena pek kawpin hypotensive effect a sang sawt thei.
b) Alcohol (zu) nena eikawpin hypotensive effect a sang sawt bawk.
c) General anaesthetics hian CCB nena pek kawpin hypotensive effect a sang sawt thei.
d) CCB hypotensive effect hi NSAIDs ho hian an tibo thei a ni.
e) Nifedipine hian quinidine plasma concentration (taksaa a hnathawh) a tisang sawt.
f) Rifampicin hian CCB te hnathawh nasa takin a pui thei.
g) Nifedipine hi insulin nen pek kawp hian glucose tolerance a tidik lo zo vek.
h) Phenytoin hian Nifedipine hnathawh nasa takin a tihniam thei a ni.
i) Mefloquine (antimarials) nena CCB pek kawp hian bradycardia a thlen thei.
j) Cimetidine hian CCB hnathawh nasa takin a tichak.
k) CCB hi clonidine nena pek kawpin hypertensive effect a tisang sawt thei.
1) Diuretics nena pek kawpin hypotensive effect a tisang sawt thei.
m) Theophyline hi Nifedipine nena pek kawpin a hnathawh a chak sawt thei.

Atenolol/Bisoprolol/Propanolol (Beta-blockers)

a) Beta-blockers te hi ACE inhibitors te nena pek kawp hian hypotensive effect a tichak sawt thei.
b) Alcohol (zu) nena pek kawpin Beta-blockers hian hypotensive effect a tisang sawt thei.
c) General anaesthetics te nena pek kawpin Beta-blockers te hnathawh a sang sawt thei.
d) Insulin nena pek kawpin Beta-blockers hian zunthlum control-na lamah nasa takin a pui thei.
e) NSAID ho hian an hnathawh a tichhia (block) thei.
f) Baclofen, Tizanidine te nena hman kawpin antihypertensive effect a tisang thei.
g) Cimetidine te nena pek kawpin plasma concentration a tisang.
h) Carbenozolone hian a hnathawh a tibo vek thei.
i) Zial zuk hian an hnathawh a titlem sawt thei.
j) Anxiolytics leh hypnotics hian an hnathawh a tichak thei.
k) Diuretics nena hman kawpin a hnathawh a tisang thei.

ACE INHIBITORS

1) ACE inhibitors te hi alcohol nena pek kawpin hypotensive effect a tichak sawt thei.
2) Allopurinol leh captopril te hi pek kawp chuan risk of toxicity a sang emem a, a bik takin zunkawng lam that lohna a thlen thei.
3) ACE inhibitors leh Alpha-blockers (eg: Prazosin, Indoramin, Doxazosin, Terazocin) te pek kawp hian hypotensive effect a sang sawt thei.
4) ACE inhibitors te hi NSAID nena pek kawp hian zunkawng lam that lohna a thlen nasa thei em em a. Tin, hypotensive effect a bo vek thei. Hyperkalaemia a thlen thei bawk. Chuvangin pek kawploh a tha.
5) Antacid te hian ACE inhibitors te absorption a timuang.
6) Rifampicin hian ACE inhibitors te plasma concentration a tihniam thei.
7) ACE inhibitors te hian anticoagulants (eg: Heparin) nena pek kawp hian Hypercalaemia a thlen thei.
8) ACE inhibitors tena hypotensive effect an neih hi MAO inhibitors te hian nasa takin an tanpui.
9) Antidiabetics (insulin, metformin, sulphonylurea) te hnathawh hi ACE inhibitors ten an pui thei.
10) Corticosteroids te hian ACE inhibitors te hnathawh a tibo (antagonise) vek thei.
11) ACE inhibitors te hypotensive effect hi muscle relaxant (eg: Baclofen, Tizanidine) te hian an tichak sawt thei.
12) ACE inhibitors te hypotensive effect hi ulcer healing drugs (Carbenoxolone) ten an tibo (antagonise).
13) ACE inhibitors te hypotensive effect hi vasodilator antihypertensive (eg: hydralazine, nitroprusside) ten an tichak thin.

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NUCLEIC ACID TEST

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Every hour of every day, thousands of patients worldwide receive life saving transfu sions of Blood and Blood products. The WHO underscores the need for transfusion related Blood Safety saying that 'Blood transfusion is the most efficient mode of transmission of infectious agents, such as HIV, Hepatitis B & C'. An early and accurate detection of these transfusion transmitted Infection (TTI) is the vital in the battle against these destructive diseases. The current ELISA technology relies on the detection of Antibodies that may not appear in blood until up to 3 months after infection, leaving a 'Window Period' in which there is a risk of transfusion transmitted infection.

With the obvious limitations with the antibody blood screening methods, a new screening technology Nucleic Acid Test (NAT) was developed for screening of Human Immunodeficiency Virus (HIV-1), Hepatitis B (HBV) and Hepatitis C (HCV) in donated blood to ensure safer blood and blood products. Nucleic Acid Test (NAT), a test approved by the Food and Drug Administration of the US, is based on the noble prize winning polymerase chain reaction (PCR) technology. It was first introduced by the European Plasma Industry in 1995, and subsequently introduced for blood donations in several countries in Europe and Asia.

Nucleic Acid Testing (NAT) significantly reduces the Window Period by detecting the low levels of viral genetic material (Viral Nucleic Acid) in the sample of infected donor (rather than an immune response to the virus, which appears later). This significantly increases the level of safety for donated blood supplies against these infectious agents. NAT may also detect Mutants, Occult cases and false Negatives from Serology which the serological test may fail to identify. Although NAT screening cannot completely eliminate the risk of transfusion transmitted infection, it has reduced the risk of HIV-1 and HCV.

The Window Period reduction by Cobas Taqscreen MPX assay (NAT) has been estimated by comparison with current serological assays for each virus as follows:-

Sl.No.	TTI	Window Period Using Serological Assays	Window Period Using NAT Technology
1.	HIV-1	22 days	14 days
2.	HCV	66 days	30 days
3.	HBV	59 days	14.5 days

NAT has been found to be more reliable in terms of safety incurring less human error, full traceability of samples, with closed systems which minimizes cross-contamination and enhances workflow specially for mid and high volume Laboratories.

India has the second largest population of Hepatitis patients worldwide. Countries such as India with high HBV endemicity have a high population of individuals who have been exposed to the infection and carry these antibodies making it difficult to differentiate between chronic and resolved HBV infections. The need for screening using NAT for HBV in blood donations is becoming increasingly evident due to the use of HBsAG Assays that are not capable of detecting all the S mutants' strains and occult infections. The HBV viral load during the window period is considerably lower than for HCV and HIV-1, and the use of highly sensitive NAT assay is required during screening to ensure detection.

Blood Safety is a challenge in India because of the high prevalence of HIV, HBV, and HCV, the relatively low percentage of Volunteer donors and the lack of standardization of procedures among the multitude of blood collection centers. In most developed Countries, the majority of blood donors are repeat voluntary donors, while in India, volunteers constitute 50 percent of all blood donors.

Broad Objective of Blood Safety under NACP-III (National AIDS Control Progamme) is to ensure provision of safe and quality blood to every patient in need of transfusion in the country through a well coordinated National Blood Transfusion Service. The specific objective is to ensure reduction of Transfusion associated HIV transmission to 0.5% .

SCENARIO OF MIZORAM

Let us consider the prevalence rates of HIV, HBV, HCV among blood donors in the state of Mizoram from the year 1999-2008 as follows:

YEAR	HIV	HBV	HCV
1999	0.50 %	4.28 %	Not done *
2000	0.72 %	4.85 %	Not done *
2001	0.89 %	2.37 %	0.50 %
2002	0.58 %	3.07 %	1.80 %

2003	0.73 %	2.29 %	2.70 %
2004	0.65 %	2.45 %	2.26 %
2005	0.54 %	2.39 %	2.87 %
2006	0.40 %	1.87 %	2.60 %
2007	0.66 %	1.76 %	1.90 %
2008	0. %	0. %	0. %

* Testing of blood for HCV was made mandatory w.e.f.1st June, 2001 following Supreme Court order.

This table illustrates significantly increasing endemicity reported of HIV, Hepatitis B & C among blood donors in Mizoram which highlights the need for a more sensitive and stringent screening algorithm for blood donations. Blood and Blood Components used in transfusion may never be zero risk free however these products may be screened with the best available methods to ensure safer blood and inspire public confidence.

IMPACTS OF NAT AND RESULTS OF INVESTIGATION

In mid 1999, an investigational study by American Association of Blood Banks (AABB) and College of American Pathologist (CAP) Viral Marker C Survey initiated the use of NAT for detection of HIV and HCV in blood donors, which continued until NAT licensure in late Feb, 2002. The study design had distinctive features:-

First, after a few months, more than 90% of blood supply in the United States was being tested by NAT, even though NAT was still classified as investigational by the Food and Drug Administration (FDA), and the usual test for HIV and HCV were still being performed.

Second, this transfer of a high technology test, previously used only in a limited way for individual patients, to testing a million blood donors per month necessitated solving major technical and logistical problems.

Third, the new NAT could not be completed until several days after collection. This delay was due to both a longer testing time compared with that of standard, licensed tests and added transportation time.

In India, Manipal Hospital Blood Bank, Bangalore has introduced Nucleic Acid Technology on 5th January, 2006 for the first time in India to screen donated blood.

Jeevan Blood Bank and Research Centre, Chennai has implemented Nucleic Acid Test (NAT) to detect viral DNA/RNA in every unit of donated blood for Hepatitis B & C, HIV from 14th April, 2008.

Reference:
Nucleic Acid Testing: A step towards Safer Blood by Ms. Ahila Padmanathan, Business Development cum Scientific Liaison (Blood screening and Virology) Roche Diagnostic Asia Pacific.Transcon 2007

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Ka Pharmacist hringnun lamtluang

Nupuii Ralte
Bethlehem Vengthlang

Kum 1953 khan Assam sorkar hnuaia Berry White Medical School, Dibrugarh-ah Compounder (tuna Pharmacist-a an upgrade tak hi) ka zir a. Hnam dang zinga ka awm lai khan tumah ka en sangin ka chung en nghal ngawt ngai lo va; tumah ka hmusit lo va, tumahin min hnuai enin min hmusit ngawt ngai lo. Kan inngainain kan inthian tha hlawm em em a ni.

Chutichuan, kum 1953-ah Pharmacist hna chu NEFA (Arunachal Pradesh)-ah ka thawk tan a. Kum 5 (nga) zet chutah chuan ka awm a. Kum 1959-ah ALONG-ah min transferred a, kum khat emaw lek ka awm hnuin CHANGLANG (Tirap Frontier, NEFA)-ah min sawn leh a. Kum 1966-ah Civil Hospital, Shillong-ah min transferred leh a ni. Ka service chhung hian sorkar hotute order ka hnial ngai lo va, min sawmna apiangah chuan phur takin ka kal mai thin a, lungawi takin ka hna ka thawk chhunzawm thin a ni. Ka awmna ram mite hian min ngaina em em thin a, ka hmelhriat nihte hi an chak a, kei pawhin an zinga awm chu nuam ka ti em em thin a ni.

Kum 1967-ah pasal ka nei a. Mizo tlangval fel tak mai, Army Engineer a ni a, mite zah leh ngaihsan pawh ka hlawh phah hle thin a ni. Ka post kalsanin ka pasal hnenah POONA khawpuiah ka awm a lo tul ta a. Pharmacist ka ni a, hna dil tur a awm veleh ka dil nghal vat a. PIMPRI ANTIBIOTICS FACTORY, POONA-ah hna ka hmu a, Lady Pharmacist niin hna ka thawk chhunzawm leh ta a.

Kum 1968-ah Jammu and Kashmir-a kan awm hnuin insawn a tul a. Chutah chuan Pharmacist hna thawh tur ka zawng leh ta a. Remchang takin Sericulture Dispensary-ah hna ka hmu leh hlauh mai a, phur takin Pharmacist hna chu ka chhunzawm leh ta a. Tin, hetih lai vek hian Jodhpur, Rajasthan-a hmeichhe tangrual pawlah voluntary-in ka thawk bawk a. Thlaler ram ro a ni a, a lum em em a, khawvel hi a ro vek emaw tih mai tur hial a ni a. Kawng pengthuam laiah tui in tur leh damdawi ei tur, a mamawhte hnenah ka sem thin a. Khawtual leh mikhual zin miten Pharmacist inpekna tlawm tak kha an ngai hluin ropui an ti a, mimal tak pawhin ngaihsan leh hriat ka hlawh phah em em thin a ni. Ka thawhna hluia mi, tun

thlenga zin tura min rawn sawmtu pawh an la awm nghe nghe a ni. Pathian zarah hna ka dil hian vanneihthlak takin ka hlawhtling thin.

Ka duh thlan vang pawh ni hauh lovin, a tul vang zawkin Mizoram pawnah hlir Pharmacist hna hi ka thawk a ni deuh ber a. Zoramah hi chuan Pharmacy hawngin ka theih chhung chu damdawi ka zuar thin a ni. Tar, chak lo tak ni tawh mah ila, kan profession-in hma a sawn zel tih hriat te hi a nuam ka ti thin mang e. He ka article tawite atang hian Zorama Pharmacist tuai thar, thiam tak takte hian hna zawn leh hna thawh kawngah hian courageous nei thar se ka va duh teh lul em!

Ka hna thawhnate:

1. Pasigat, NEFA
2. Along, NEFA
3. Changlong, NEFA
4. Shillong Civil Hospital
5. Pimpri Antibiotics Factory, Poona
6. Jammu and Kashmir
7. Jodhpur, Rajashthan

Vanglai nite hi zamual an liam a!

NUTRACEUTICALS IN HEALTH CARE SYSTEM

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Herbs are used by the mankind since its origin on the earth; to alleviate human illness and for the maintenance of general health. The products of natural origin for general improvement of the health are reffered as "health food" but not as drug or medicinal agent.Hence the health foods may be defined as the food supplemented with herbal ingredients, vitamins,minerals and the nutrients or ingredients isolated from the conventional food. In recent years there is growing interest of the public in the health benefits of dietary food and personal care products, with the results, more attention is being paid by the Pharma Industry towards health food (nutraceutical), herbal cosmetics and personal care products. In west the fast growing segments of health food products industry look like a revolution. This is because of the increase awareness of the consumers for health benefits of these products and growing desire for the alternative to conventional Pharmaceutical products.

The increasing interest and popularity of the health food products in Asia, Latin America, Africa and Middle East Countries has opened a new era of international trade in alternative system in medicine.Health foods are termed by different names throughout the world. i,e. functional foods in oriental and nutraceuticals in the western region, thus the nutraceuticals and functional foods are synonyms for health food products.

Nutraceuticals:

Nutraceutical is any substance that can be considered as a food or its part which, in addition to its normal nutritional value, provides health benefits including prevention of disease or promotion of health.

The nutraceuticals are associated with the prevention or treatment of four major diseases like heart disease, cancer, hypertension and diabetes. The other

diseases related to role of nutraceuticals are osteoporosis, arthritis and neural tube defects.

The food products used as nutraceuticals contain antioxidants, prebiotics, probiotics, omega 3- fatty acids and certain dietary fibres. Except probiotics, all these components are present in fruits, vegetables and different types of herbal foods.

Antioxidants:

Antioxidant nutraceuticals are those which contain vitamin E,vitamin C, vitamin A and betacarotene. They are present in some fixed oils, fruits, vegetables and fishes. Antioxidants present in such foods are those compounds which either prevent the formation of oxygen free radicals or trap them (scavenging effect).

Antioxidants or inhibitors of oxidation are compounds which relate or prevent the oxidation and in general prolong the life of the oxidizable matter. The reactive oxygen species (ROS) in the body , include superoxide anion, singlet oxygen, hydroxyl radical and hydrogen peroxide. The oxidative damage initiated by these is propagated by lipid peroxidation which may cause further damage to DNA. The body defence system against the oxidative damage consists of enzymes such as superoxide dismutases, glutathione peroxidase, catalase and the reducing agents such as glutathione, ascorbate and iron.

Generally, peroxidation of lipids leads to formation of free radicals which cause detrimental effects on various tissues and organs of the body. They may cause mutation and consequently cancer. They are also known to be involved in aetiological sequences of diseases like atherosclerosis, arthritis and aging process. The oxidation of LDL- cholesterol increases the chances of atherosclerosis. Anti-oxidants like tocopherols in vitamin E lowers the susceptibility of LDL for oxidation. Tocopherols also reduce platelets role in thrombus formation. Various plants materials like amla, myrobalan and lemon contain an anti-oxidant in the form of ascorbic acid. It prevents both the formation and scavenging of oxygen free radicals.

Polyunsaturated fatty acids (PUFA)

They are present in various vegetable oils and marine animals. These sources include safflower oil, corn oil, mustard oil, soyabean oil, etc. They help to reduce cholesterol formation /deposition. These vegetable oils mainly contain PUFA belonging to linoleic group (omega -6-type). Some marine fishes contain PUFA belonging to linolenic group (omega-3- type). The latter are found to appreciably reduce thromboxane formation and hence useful as preventive measures for atherosclerosis. In spite of high consumption of fats, Eskimos have rarely shown any evidence of atherosclerosis.The reason identified has been their consumption of such water fish oils which contain appreciable quantities of omega-3-fatty acids.

Probiotics:

These are the living microorganisms, which when taken with or without

food, improve the intestinal microbial balance, and in turn, functioning of the large intestine. Probiotics include Bifidobacterium and Lactobacilli species such as L. acidophilus. These microorganisms exert their effects by producing substances and conditions which inhibit the growth of harmful bacteria in the large intestine. The dairy products like sour milk and A/B- culture yoghurts contain these probiotics.

Prebiotics:

They are the nutraceuticals which promote the flourishing of probiotics. Before reaching to colonic region, the probiotic microorganisms have to survive the digestive enzymes and acids in the upper gut. To overcome this problem, Prebiotics are the food substances which reach to colon in intact form, without getting depleted by gastric PH and digestive acids. Prebiotics also selectively promote the growth of colonic probiotic bacteria. At present, the best known prebiotic is inolin. It is a polyfructose obtained mainly from raw chicory (roots of Cichorium intibus) or Jerusalem Artichoke. Chicory is reach in fibrous polysaccharide inulin.It is a soluble dietary fibre and resistant to digestive enzyme. Lactobacilli and Bifidobacteria digest inulin and feed themselves on it. Hence, prebiotics act as fertilizers for these symbiotic bacteria.

Dietary Fibres:

These play a crucial role in maintenance of health. They can be defined as such parts of plant stems, leaves and seeds which human body cannot digest and absorb. High fibre intake gives various benefits to human body. viz:- a) Water -soluble and b) Water- insoluble fibres. Insoluble fibres mainly help in bulking of stool and their quick passage through digestive canal. Soluble fibre dissolves in water and forms a gel that binds the stool. Insoluble fibres are present in brown rice, bananas, cassavas, vegetables and whole grain cereals like wheat, oats, barley and sorghum. Soluble fibres are present in oats, dried beans, legumes, chicory etc.

The current trends in bio-drugs indicate the commercial utility of omega-3 fatty acids, spirulina, soya, garlic and royal jelly as important milestones in the development of nutraceuticals.

Omega-3 Fatty acids:

Omega-3 Fatty acids are Eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA). They are polyunsaturated essential fatty acids mainly of marine origin. They are found in cold water fishes like cod, salmon, tuna, sardines, blue fish, mackerel and herring. Cold weather bean oil plants like flax seed and canola contain omega-3fatty acids. Walnuts, soyabean and freshly ground wheat germ are also valuable sources.

Omega-3 fatty acids are important components of all cell membranes. Their presence in the cell membrane increases the physicochemical stability and functional integrity of the cell. They are essential for normal growth and develop-

ment at all stages of life. Omega-3 fatty acids make the cells susceptible to oxidative damage as well as they decrease the formation of lipidperoxides.

It has been found that Omega-3 fatty acids have significant role in atherosclerosis.The major risk factor is increased levels of low -density lipoprotein (LDL), which carries 70% of total serum cholesterol. Contrary to LDL, high-density lipoprotein (HDL) helps to clear cholesterol from arterial wall lesions, and hence reduces the risk.

Omega-3 fatty acids have been found to be useful due to their following activities:

- Suppression of smooth muscle cell proliferation and migration.
- Reduction of LDL and VLDL levels. Decrease in hypercholesteraemia and triglyceridaemia.
- Increase in HDL levels.
- Reduction in thromboxane formation and increased fibrinolysis.

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