



The NGSMIPS Herald

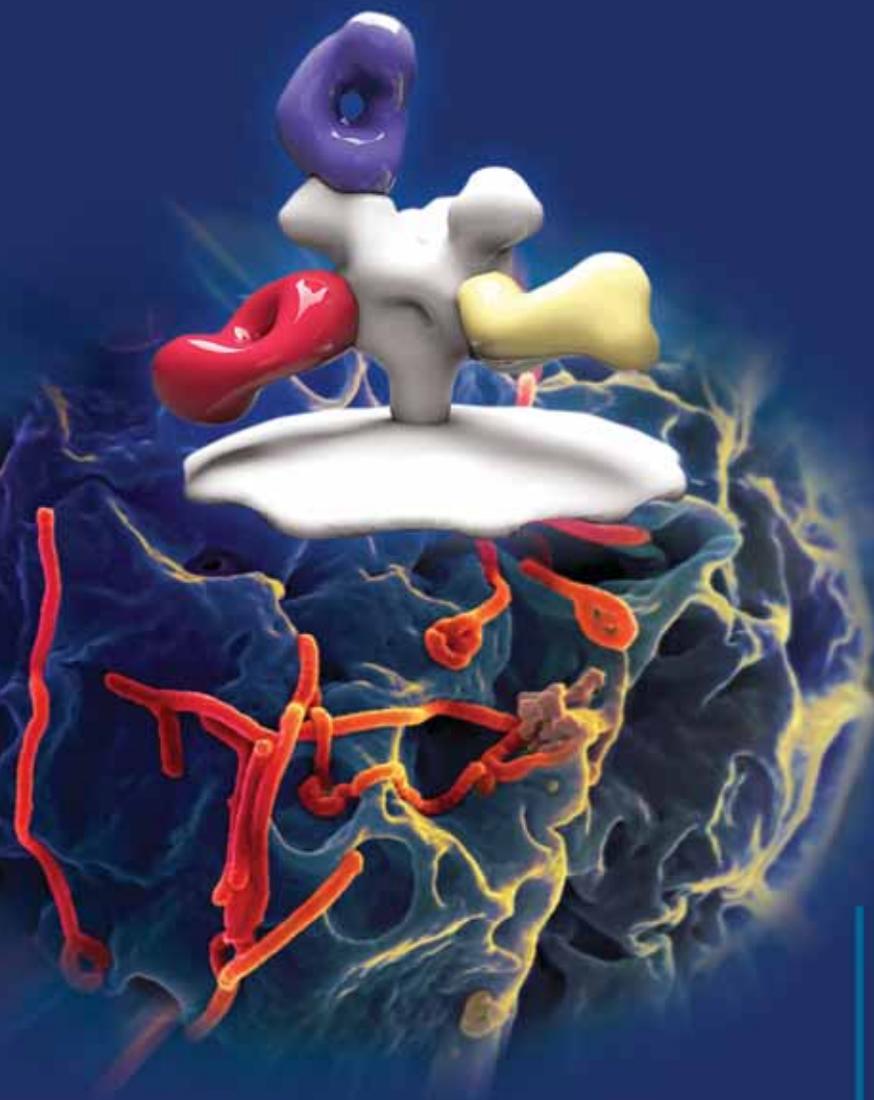
The Official news letter of the Nitte Gulabi Shetty Memorial
Institute of Pharmaceutical Sciences, Mangalore



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Z Mapping the Ebola Virus

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VISION

To build a humane society through excellence in education and health care.

MISSION

To develop Nitte University as a centre of excellence, imparting quality education, generating competent, skilled manpower to face the scientific and social challenges with a high degree of credibility, integrity, ethical standards and social concern.

'For Private Circulation Only'



From the Editor's desk

What is that you expect from a pharmacy graduate when he approaches you for a placement soon after his studies? – I asked of Dr. Karthik Bhopanna, MD and CEO of Semler Research Centre, Bangalore.

Very simple – excellent communication skills and positive attitude. The first hurdle to cross is the HR scrutiny, which tries to assess the communication skills and aptitude of the candidate. A good scoring at this level makes the task of getting a suitable placement much easier. The technical knowledge assessment comes only after that- he opined.

He was not alone to stress on this point. Unfortunately, the academic programmes give least importance to soft skill development in their curriculum. The feedback taken from several leading pharmaceutical industries in Karnataka and Goa suggests that it is very essential to impart soft skills such as communication skill to students during formative years. Also longer period of hands on training will give some insight about the technological advances made in pharmaceutical industry.

The students hence should strengthen their communication skills and develop the right attitude to succeed in the highly competitive environment. The institutions imparting training should re orient themselves to the expectations of the industry and do the necessary revision of the syllabus to make it contemporary.

I wish all the readers of the NGSMIPS Herald a very happy and prosperous 2015.

C.S. Shastry

Inauguration of Pharmacovigilance Centre at K.S. Hegde Hospital



Blood Donation Camp at NGSMIPS



CAMPUS BUZZ

Observance of Swachh Bharat Abhiyaan at NGSMIPS

NGSM Institute of Pharmaceutical Sciences, Paneer and NSS unit of the institution organized Swachh Bharat Abhiyaan at institutional level on 17th October, 2014 at the college premises, at 3.00 pm. The



programme was inaugurated by Mr. Shekar Kaneerthota, Panchayat President, Kotekar in the presence of Prof. Dr. M. S. Moodithaya, Registrar, Nitte University, Dr.C.S. Shastry, Principal and Dr. Muralee Mohan

Choontharu, NSS Co-ordinator, Nitte University, Mangalore. While addressing members of Kotekar Gram Panchayat, NSS programme officer, faculty and students of NGSM Institute of Pharmaceutical Sciences, Mr. Shekar Kaneerthota spoke about the responsibility of the individual in the society to maintain cleanliness of their surroundings and to motivate others also to do so. Prof. Dr. M. S. Moodithaya appreciated the initiative of the institution to observe 'Swachh Bharat Abhiyaan' and hoped that the practice would continue on a regular basis. Soon after, the Principal, faculty and students of the institution started a rally with a banner and proceeded to clear up litter around the campus.

B.Pharm students visit Jeddu Ayurveda Pharmacy and Botanical Gardens at Alike

A study tour to Jeddu Ayurveda Pharmacy and Botanical Gardens, Alike was arranged for the students of final year B.Pharm on November 11, 2014, to familiarise them with various species of medicinal plants in the sprawling 1-hectare medicinal plant garden situated at Jeddu in Alike village, Dakshina Kannada district. The medicinal garden has many rare, endangered and red listed medicinal plants for the sole purpose of conservation and identification. Here more than 250 species of medicinal plants are conserved.



Dr. Ganapathi Bhat, one of the trustees of the Jeddu Ayurveda Seva Trust and who has expertise in identification, *in situ* conservation and propagation of medicinal plants, explained to the students about the

medicinal properties of various plants and the strict quality that needs to be observed at every stage in the manufacture of formulations.

On the way back, the students also visited the Kanyana Bharath Seva Ashram for the old and interacted with the inmates and donated cash as a token of love and respect.

The students were accompanied by Dr. C.S.Shastry, Principal and members of the faculty- Dr. Gururaj, Mr. Pankaj, Mr. Santanu and Mr. Atanu.

Inauguration of Pharmacovigilance Centre at K.S. Hegde Hospital

The Pharmacovigilance Centre of K.S.Hegde Medical Academy & Hospital and NGSM Institute of Pharmaceutical Sciences, Paneer, Deralakatte was inaugurated on 12th November 2014. The centre has

been established to document and report all suspected Adverse Drug Reactions observed in patients in the Justice K.S.Hegde Charitable Hospital to the Central Drugs Standard Control Organization (CDSCO), Directorate General of Health Services under the aegis of Ministry of Health & Family Welfare, Government of India in collaboration with Department of Pharmacology, All India Institute of Medical Sciences (AIIMS), New Delhi. The Centre will be expanding its reach to the community pharmacy and other hospitals of the region.

Dr. M.S Moodithaya, Registrar, Nitte University inaugurated the centre and in his address to faculty and students, he stressed on the interdisciplinary approach in the area of health care to provide the best service to the patients.

Dr. C.S.Shastry, Dean, NGSM Institute of Pharmaceutical Sciences presented an over view of the pharmacovigilance centre and explained the significance of such centres in drug regulation as an important step towards monitoring patient safety.

Dr. Satish Bhandary, Dean, K.S.Hegde Medical Academy Dr. Karuna Ramesh, Medical Superintendent, Justice K.S.Hegde Charitable Hospital and Dr. Rajendra Holla were also present.

Guest Lecture

Dr. Himanshu Joshi, Asst. professor, Department of Pharmacology delivered a guest lecture on "Personality development" at Sri Bangi Bassapa Pre- University Science College, Harapanahalli, Davanagere, Karnataka, on 18th Nov, 2014. The lecture was attended by B.Pharm and M.Pharm students as well.

Sports Day

Sports day was observed by NSMIPS on November 14, 2014 at the Mangalore University grounds. The Meet was formally inaugurated by the Principal, Dr. C.S. Shastry and attended by students and staff. The many events that were organized throughout the day saw sizeable participation from students of all classes and even from the faculty. The individual Sports Championship for boys was secured by Mr. Abooboker Yasir of I B.Pharm and that for girls was bagged by Ms. Thrpthi Shetty of IV B. Pharm.

Literary and Cultural competitions held at NGSMIPS

The NGSM Institute of Pharmaceutical Sciences organized several competitions, both literary and cultural among students in the month of November, 2014. The literary festival on 17th – 24th November, 2014 named, 'Littera 2014' had events such as, Short Story, Calligraphy, Picture quote, Who Am I, Poetry, Collage, Debate, Photography, Sudoku, Pencil Sketch, Spelling Bee, Extempore, Dumb Charades, Ad – Poster Making and Crossword. The first place was bagged by the III year B.Pharm while the second and third places went to the IV year B.Pharm and I year M.Pharm respectively.

The cultural competition, 'Sambhram 2014' was conducted from 1st – 3rd December, 2014 in the college campus. Various events namely 'Twins' Day, Floral Arrangement, Water Drinking Competition, Face Painting, Rangoli, Slow Bike Race, Class Exhibition, Cooking without Flame, Rab Ne Bana Di Jodi, Hair Style, Nail Art, Antakshari, Mehendi and Traditional Day were held. The cultural festival, 'Sambhram 2014' culminated in a one day extravaganza of more events held class wise on 10th December, 2014 with programmes like Singing (Solo/Duet/Group), Dancing (Solo/Duet/Group), Comedy Skit, Fashion Show, Spot dance. The IV B.Pharm came out trumps, securing the first

place while the second and third places were bagged by the III B.Pharm and III Pharm.D respectively.

Blood Donation Camp and Book Release

The NSS unit of the NGSM Institute of Pharmaceutical Sciences under the leadership of Mr. Sanatanu Saha, Asst. Professor, Department of Pharmacognosy conducted a blood donation camp in coordination with the Blood Bank of Justice K.S. Hegde Charitable Hospital on 25th November, 2014. The venue for the camp was the auditorium of the Nitte Institute of Banking and Finance, Paneer campus, Deralakatte. The camp was inaugurated by the chief guest Dr. S. Ramananda Shetty, Vice Chancellor, Nitte University and the guest of honour, Dr. N. Sukumara Gowda, Founder Director, Centre for Studies in Education, Puttur in the presence of NSS co-ordinator of Nitte University Dr. Muralee Mohan Choontharu and Dr. C.S. Shastry, Principal NGSM institute of Pharmaceutical Sciences. On the occasion, Dr. S. Ramananda Shetty released the book "Blood Donor Be Life Saver" authored by Dr. Muralee Mohan Choontharu in Kannada and translated into English by Dr. Sukumara Gowda. Dr. S. Ramananda Shetty, explained the importance of NSS activities and congratulated the NSS unit of NGSMIPS for organizing the programme and Dr. Muralee Mohan Choontharu and Dr. N. Sukumara Gowda for their

work on publishing their book. Later at the camp, several students and faculty members donated blood.

One Day workshop on Taxidermy



A one day workshop on Taxidermy was organized by the Institution on November 26, 2014. The resource person was Mr. Mohan Parashuram Moreya renowned taxidermist and senior international athlete and who worked at the Karnataka Science College, Dharwar. Mr. Morey explained briefly about the

fundamentals of Taxidermy and various techniques adapted for preserving the skin, together with the fur, feathers, or scales of animals. He demonstrated the stuffing technology for various animals namely, crab, Katla fish and rat. Mr. Morey also provided information regarding tools and materials to be used for the stuffing, reference books etc. The workshop was attended by 15 participants including faculty, PG students and laboratory assistants.

DEPARTMENT ACTIVITIES

DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

RESEARCH PUBLICATIONS

DR. K. ISHWAR BHAT, Professor

A Review on Monoclonal Antibodies in Cancer Therapy and Immune Disease *International Journal of Institutional Pharmacy and Life Sciences*, 2014; 4 (6): 161-184

MR. PANKAJ KUMAR, Asst. Professor

Synthesis of Some Active Oxazolidinones Derivatives and Evaluation of their Antimicrobial and Anti-Inflammatory Activities. *Research Journal of Pharm. and Tech.*, 2014; 7(11): 1292-1296

DEPARTMENT OF PHARMACEUTICS

RESEARCH PUBLICATIONS

DR. R. NARAYANA CHARYULU, Professor

In Vivo Bioavailability Studies of Buccoadhesive Compacts of Lercanidipine Hydrochloride *International Journal of Pharmaceutical Sciences Review and Research* Nov-Dec 2014; 29 (1): 49-52

DR. MARINA KOLAND, Professor

Evaluation of *In Vitro* Release and *In Vivo* Transbuccal Permeation of Losartan Potassium from Mucoadhesive Films. In: *Proceedings of the 2nd Annual International Conference on Pharmacology and Pharmaceutical Sciences (PHARMA 2014); 27-28 Oct 2014; Singapore*. Singapore: Global Science and Technology Forum (GSTF); 2014. p.12-15

DR. MUDIT DIXIT, Asst. Professor

1. Enhancing Solubility and Dissolution of Lovastatin by

Freeze Drying Technique *IJPRBS*, Vol. 3 (5), 2014, pp. 237-248

2. Enhancing Solubility and Dissolution of fenofibrate by Freeze Drying Technique *IJPRBS*, Vol. 3 (5), 2014, pp. 298-308
3. Spray Dried Microparticles of Valsartan by Drying Technique. *IJPRBS*, Vol. 3 (5), 2014, pp. 298-308
4. Preparation of Spherical Agglomerates of Tolfenamic Acid. *Elixir International Journal* 76, 2014, pp.28311-28315
5. Preparation and Characterisation of Spherical Agglomerates of Tenoxicam. *International Journal of Pharmaceutical Sciences Review and Research*, 29 (1), Nov-Dec 2014, pp. 140-145
6. Monophase Solution for Enhancing Solubility and Dissolution of Ezetimibe by Spray Dried Microparticles. *Trends in Drug Delivery* Vol. 1, Issue 2, pp. 1-7
7. Pharmaceutical Product Registration and Requirements in CIS Countries. *Trends in Drug Delivery* Vol. 1, Issue 3, pp. 1-8
8. Pharmaceutical Products Registration Requirements for ASEAN and GCC Countries *Trends in Drug Delivery* Vol. 1, Issue 3, 2014, pp.9-16
9. Enhancing Solubility and Dissolution of Olanzapine by Spray Drying Using β -Cyclodextrin Polymer. *Journal of Applied Pharmaceutical Sciences*, Vol.4, Issue 11, Nov. 2014, pp. 082-086
10. Marketing Authorization Procedure and Their Requirements for Pharmaceutical Products in European Union. *Research & Reviews: A Journal of Drug Formulation, Development and Production*, Vol. 1, Issue 3, 2014, pp. 1-8

MR. JOBIN JOSE, Asst. Professor

Performance Evaluation of Melt in Films of Rizatriptan Benzoate Using Different Film Forming Agents. *American Journal of Pharmacy and Health Research*, Dec 2014; 2(2): 286-298

PAPERS PRESENTED AT CONFERENCES

Dr. Marina Koland has attended and orally presented her research paper on, "Evaluation of *In Vitro* Release and *In Vivo* Transbuccal Permeation of Losartan Potassium from Mucoadhesive Films" at the 2nd Annual International Conference on Pharmacology and Pharmaceutical Sciences (PHARMA 2014), 27th and 28th October 2014, Singapore. The paper was co-authored by Dr. R. Narayana Charyulu.

DEPARTMENT OF PHARMACY PRACTICE**RESEARCH PUBLICATIONS**

MR. JAVEDH SHAREEF, Asst. Professor

1. Impact of Pharmacist provided patient counselling on quality of life in patients with asthma in a tertiary care teaching hospital. *International Journal of Pharma Research & Review*, 2014; 3(2): 1-10.
2. Assessment of Drug Related Problems in Patients with Cardiovascular Diseases in a Tertiary Care Teaching Hospital. *J Pharm Care*, 2014; 2(2):13-19.
3. Impact of Pharmacists counseling on quality of life in patients undergoing hemodialysis in a tertiary care teaching hospital. *World J Nephrol Urol*. Dec 2014; 3(4): 143-150.

MR. JUNO J. JOEL, Asst. Professor

1. Cost Analysis of Antihypertensive Drugs Prescribed in a Tertiary Care Teaching Hospital *International Journal of Research and Development in Pharmacy and Life Sciences*, Dec-Jan. 2014; 4(1): 1371-1374
2. Drug Utilization Pattern of Antihypertensives in a Tertiary Care Hospital in South India, *World Journal of Pharmacy and Pharmaceutical Sciences* Oct. 2014; 3(10): 1094-1099
3. Schizophrenic Patient Care – Pharmacists Role. *Scholars Academic Journal of Pharmacy* 2014; 3(5): 356-362
4. Antipsychotic Drug Prescribing Patterns for Schizophrenia in a University Teaching Hospital. *European Journal of Biomedical and Pharmaceutical Sciences* Nov 2014; 1(3): 413-423

PAPERS PRESENTED AT CONFERENCES

Mr. Juno Joel has presented a paper entitled, 'Evaluation of Adverse drug Reactions Associated with the Psychotropic Drugs in the Management of Patients with Schizophrenia' at the. 19th Annual National Convention of Association of Pharmaceutical Teachers of India (APTICON 2014), Shree Shiva Chatrapati Sports Complex,

Balewadi, Pune, 28th – 30th November 2014. The paper was co-authored by Dr. C.S. Shastri and Dr. Satheesh Rao

WORKSHOPS/SEMINARS ATTENDED

Mr. Javedh Shareef and **Mr. Juno Joel** participated as delegates in the CME on "Drug Prescription: Current Scenario" conducted by Department of Community Medicine held at KSHEMA auditorium, Derlakatte, Mangalore. 12th December 2014

Mr. Juno Joel participated as a delegate in the 19th Annual National Convention of Association of Pharmaceutical Teachers of India (APTICON 2014) on "Emerging Trends in Pharmacy Profession and Education" held at Shree Shiva Chatrapati Sports Complex, Balewadi, Pune. 28th – 30th November 2014.

DEPARTMENT OF PHARMACOLOGY

DR. C.S. SHASTRY, Professor

The Evaluation and Comparison of Radioprotective Activity of Ethanolic Extracts of Capparis Aphyllia and Paederia Foetida on Swiss Albino Mice Against Whole Body Electron Beam Irradiation. *World Journal of Pharmacy and Pharmaceutical Sciences* 2014; 3(6): 1123-1138

Dr. Gururaj M.P. and **Dr. Himanshu Joshi** organized a Quiz competition on November 22, 2014 for the students of NGSMIPS in preparation for the All India level Quiz Competition to be held at Madras Medical College, Chennai. Eighteen students qualified for the same.

DEPARTMENT OF PHARMACOGNOSY**RESEARCH PUBLICATIONS**

MR. ATANU BHATTACHARJEE, Asst. Professor

Neuroprotective Activity of Crataeva Nurvala Buch-Ham Stem Bark against Scopolamine Induced Cognitive Impairment via Antioxidative Activities in Rats. *American Journal of Ethnomedicine* 2014; 1(6): 371-383

DEPARTMENT OF LIBRARY AND INFORMATION CENTRE

MR. CHANDRASHEKHAR D, Librarian

Published and presented a paper entitled, "Applications of Total Quality Management in Library and Information Centre" at the two day International Conference on "Building Knowledge Centres" on 1st & 2nd January, 2015 held at NMAM Institute of Technology, Nitte, Karkala

EBOLA – A LIFE THREATENING DISEASE

Compiled by: **Ms. Sanjivi Kudtarkar & Ms. Nandini**
II Year M.Pharm, Department of Pharmaceutics

Background

Ebola virus disease (EVD), formerly known as Ebola haemorrhagic fever, is a severe, often fatal illness in humans. The Ebola virus causes an acute, serious illness which is often fatal if untreated. Ebola virus disease (EVD) first appeared in 1976 in 2 simultaneous outbreaks, one in Nzara, Sudan, and the other in Yambuku, Democratic Republic of Congo. The latter occurred in a village near the Ebola River, from which the disease takes its name.

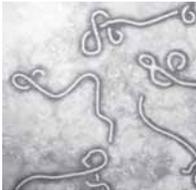
The current outbreak in west Africa, (first cases notified in March 2014), is the largest and most complex Ebola outbreak since the Ebola virus was first discovered in 1976. There have been more cases and deaths in this outbreak than all others combined. It has also spread

between countries starting in Guinea then spreading across land borders to Sierra Leone and Liberia, by air (1 traveller only) to Nigeria, and by land (1 traveller) to Senegal.

The virus family Filoviridae includes 3 genera: Cuevavirus, Marburgvirus, and Ebolavirus. There are 5 species that have been identified: Zaire, Bundibugyo, Sudan, Reston and Tai Forest. The first 3, Bundibugyoebolavirus, Zaire ebolavirus, and Sudan ebolavirus have been associated with large outbreaks in Africa. The virus causing the 2014 West African outbreak belongs to the Zaire species.

Transmission

It is thought that fruit bats of the Pteropodidae family are natural



Ebola Virus

Ebola virus hosts. Ebola is introduced into the human population through close contact with the blood, secretions, organs or other bodily fluids of infected animals such as chimpanzees, gorillas, fruit bats, monkeys, forest antelope and porcupines found ill or dead or in the rainforest.

Ebola then spreads through human-to-human transmission via direct contact (through broken skin or mucous membranes) with the blood, secretions,

organs or other bodily fluids of infected people, and with surfaces and materials (e.g. bedding, clothing) contaminated with these fluids.

People remain infectious as long as their blood and body fluids, including semen and breast milk, contain the virus. Men who have recovered from the disease can still transmit the virus through their semen for up to 7 weeks after recovery from illness.

Symptoms of Ebola virus disease

The incubation period, that is, the time interval from infection with the virus to onset of symptoms is 2 to 21 days. Humans are not infectious until they develop symptoms. First symptoms are the sudden onset of fever fatigue, muscle pain, headache and sore throat. This is followed by vomiting, diarrhoea, rash, symptoms of impaired kidney and liver function, and in some cases, both internal and external bleeding (e.g. oozing from the gums, blood in the stools). Laboratory findings include low white blood cell and platelet counts and elevated liver enzymes.

Diagnosis

It can be difficult to distinguish EVD from other infectious diseases such as malaria, typhoid fever and meningitis. Confirmation that symptoms are caused by Ebola virus infection are made using the following investigations:

- antibody-capture enzyme-linked immunosorbent assay (ELISA)
- antigen-capture detection tests
- serum neutralization test
- reverse transcriptase polymerase chain reaction (RT-PCR) assay
- electron microscopy
- Virus isolation by cell culture.

Samples from patients are an extreme biohazard risk; laboratory testing on non-inactivated samples should be conducted under maximum biological containment conditions.

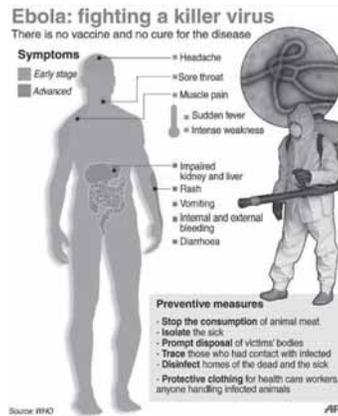
Treatment and vaccines

Supportive care-rehydration with oral or intravenous fluids- and treatment of specific symptoms, improves survival. There is as yet no proven treatment available for EVD. However, a range of potential treatments including blood products, immune therapies and drug therapies are currently being evaluated. No licensed vaccines are available yet, but 2 potential vaccines are undergoing human safety testing. ZMapp is an experimental treatment that can be tried, although it has not yet been tested in humans for safety or effectiveness. The product is a combination of three different antibodies that bind to the protein of the Ebola virus.

Prevention and control

Good outbreak control relies on applying a package of interventions, namely case management, surveillance and contact tracing, a good laboratory service, safe burials and social mobilisation. Community engagement is key to successfully controlling outbreaks. Raising awareness of risk factors for Ebola infection and protective measures that individuals can take is an effective way to reduce human transmission. Risk reduction messaging should focus on several factors:

- **Reducing the risk of wildlife-to-human transmission** from contact with infected fruit bats or monkeys/apes and the consumption of their raw meat. Animals should be handled with gloves and other appropriate protective clothing. Animal products (blood and meat) should be thoroughly cooked before consumption.

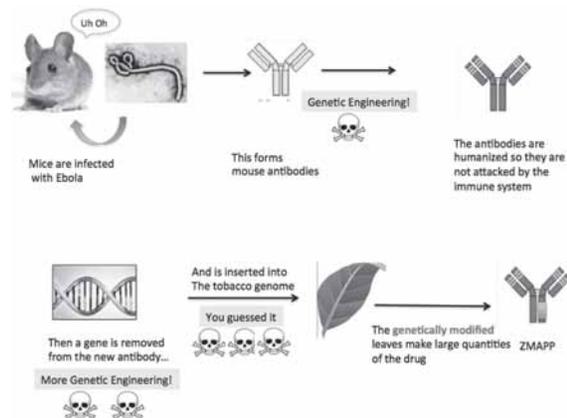


- **Reducing the risk of human-to-human transmission** from direct or close contact with people with Ebola symptoms, particularly with their bodily fluids. Gloves and appropriate personal protective equipment should be worn when taking care of ill patients at home. Regular hand washing is required after visiting patients in hospital, as well as after taking care of patients at home.

- **Outbreak containment measures** including prompt and safe burial of the dead, identifying people who may have been in contact with someone infected with Ebola, monitoring the health of contacts for 21 days, the importance of separating the healthy from the sick to prevent further spread, the importance of good hygiene and maintaining a clean environment.

ZMapp

There is no federally approved treatment and no vaccine for Ebola. One of the drugs the world is pinning its hopes on is a drug cocktail called ZMapp.



ZMapp is composed of three ‘humanised’ monoclonal antibodies manufactured in plants, specifically Nicotiana. It is an optimised cocktail combining the best components of MB-003 and ZMAb which bind to the Ebola virus rendering it harmless. The drug was initially obtained by infecting mice with a protein from the Ebola virus, and then modifying the mice’s antibodies to more closely resemble human ones.

The results then need to be produced in large volumes, so scientists have turned to an interesting ally: plants. First a genetically engineered virus is injected into a tobacco plant. The plant then produces antibodies. Cloned “humanized” antibodies are separated from the plant, purified, and turned into doses. In a patient, those antibodies attach themselves to Ebola’s harmful cells and destroy the virus.

Conclusion

Ebola virus is highly virulent and fatal, and treatment options are limited. Several experimental and existing therapies may be options for preventing and treating Ebola virus disease.

References

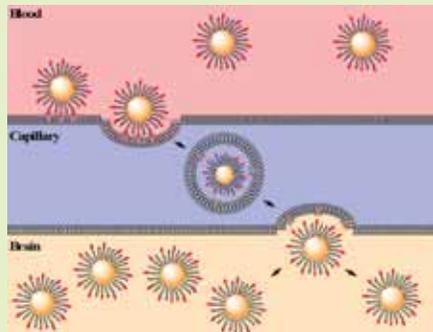
1. International business times. UK edition. 14 Jan 2015.
2. en.wikipedia.org/wiki/ZMapp
3. www.who.int/mediacentre/factsheets/fs103/en

SOLID LIPID NANO PARTICLES FOR INTRANASAL DELIVERY

Compiled by: **Mr. Bopanna Achaiiah**
II Year M.Pharm
Department of Pharmaceutics

The intranasal drug delivery offers a number of advantages such as easy accessibility and good permeability especially for lipophilic, low molecular weight drugs. This route of drug delivery system promotes ease and convenience of administration, deliverance of accurate dose and also prolongs residence time of drug in contact with mucosa. Respiration and olfaction is the major function of nasal cavity. The nasal cavity extends back from the outer nose into the head and connects with the sinuses which are the hollow areas. The nasal cavity is covered with a thin and smooth layer of mucosa-nasal mucosa. The nasal mucosa is supplied with blood and glands that secrete fluids. Nasal route is used in the treatment of many diseases of the central nervous system like schizophrenia, meningitis, migraine, and Parkinson's diseases which require delivery of drug to the brain. There are certain drugs which have low permeability across the blood brain barrier. To improve the permeability of those drugs across the blood brain barrier, different kind of approaches are used like nano particles, solid lipid nanoparticles, nanostructured lipid carriers are used which acts as carrier of drug molecules to the desired site of action.

Solid lipid nanoparticles (SLN) which were introduced in 1990, consists of spherical solid lipid particles in the nanometer ranges. Generally, they are made up of solid hydrophobic core having a monolayer of phospholipids coating. The solid core contains the drug dissolved or dispersed in the solid high melting fat matrix.



The hydrophobic chains of phospholipids are embedded in the fat matrix, they have potential to carry lipophilic or hydrophilic drugs or diagnostics with mean particle diameters ranging from 50 up to 1000 nm. SLN's are solid

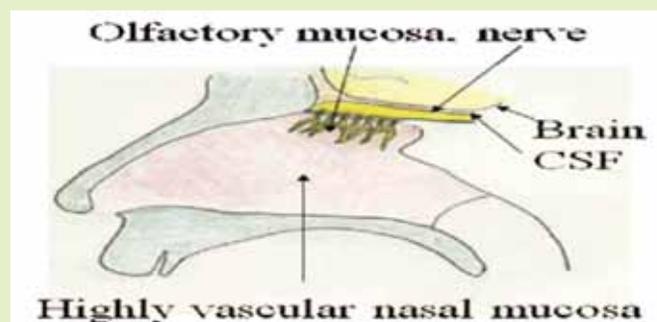
at room temperature therefore, the mobility of incorporated drugs is reduced and the biological activity is increased compared to parent bulk materials due to their larger surface area which is a prerequisite for controlled drug release. SLNs have unique properties such as small size, large surface area, high drug loading and the interaction of phases at the interfaces which are very useful for the drugs having problems in permeability, solubility, transporting the drug molecules across blood brain barrier. Drug loaded SLN's have high bioavailability and low toxicity. There are different methods for preparing solid lipid nano particles such as

1. High pressure homogenization
 - a. Hot homogenization
 - b. Cold homogenization
2. Ultra sonication /high speed homogenization
 - a. Probe ultra-sonication
 - b. Bath ultrasonication

3. Solvent evaporation Method
4. Solvent emulsification-diffusion method
5. Supercritical fluid method
6. Micro emulsion based method

Among the drug carriers used for intranasal delivery, nano carriers hold a great promise because of their capacity to protect encapsulated bio macromolecules such as peptides, protein or nucleic acid-based antigens. SLN's promote interaction of Nano carriers with mucosae and direct antigens towards lymphoid tissues as potential inductive sites.

Drugs ranging from small chemicals to large macromolecules including peptide/protein therapeutics, hormones, and vaccines, are being delivered through the nasal cavity. The nasal delivery seems to be a favorable way to circumvent the obstacles for blood-brain barrier (BBB) allowing the direct drug delivery in the bio phase of central nervous system (CNS) active compounds. It has also been considered in the administration



of vaccines, drugs such as, Buserelin, desmopressin, calcitonin, insulin, luteinizing hormone releasing hormone, growth hormone and adreno-corticotrophic hormone are some of the peptides that have been successfully administered through the nasal route. Apart from these, steroids (corticosteroids, estradiol, progesterone, testosterone etc.) antihypertensives (nifedipine, nitroglycerine, propranolol, hydralazine, etc.), analgesics (buprenorphine), antibiotics and antivirals have been shown to produce considerable systemic effects when administered via the nasal cavity.

The different kinds of drugs like lipophilic and hydrophilic was proved to show good bioavailability and high permeability because of their increased surface area and small particle size, when it is administered through nasal route, which are often identical to those obtained after an intravenous injection with a bioavailability approaching 100%.

REFERENCE:

- 1) Rakhi C, Lakshmi G. Nasal Route: A Novelistic Approach For Targeted Drug Delivery To CNS. *Int Res.j.Pharma*.2013,4(3).
- 2) Yadav N, Khatak S. Solid Lipid Nanoparticle. *Int.j.Pharma*.2013:5(2)

Cultural Day, 10-12-2014



Sports Day - 14-11-2014



Book Post