

Vision

TO GROW AS A CENTRE OF EXCELLENCE IN THE FIELD OF
PHARMACEUTICAL AND BIOLOGICAL SCIENCE



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For Back-Issues,

<mailto:gnipstbulletin@gmail.com>

EDITOR: Soumya Bhattacharya

**GURU NANAK INSTITUTE OF PHARMACEUTICAL SCIENCE AND
TECHNOLOGY**

21-06-2013

MESSAGE FROM GNIPST

GNIPST BULLETIN is the official publication of **Guru Nanak Institute of Pharmaceutical Science & Technology**. All the members of GNIPST are proud to publish the 26th Volume of “GNIPST BULLETIN”. Over the last two years this bulletin updating readers with different scientific, cultural or sports activities of this prestigious institute and promoting knowledge of recent development in Pharmaceutical and Biological Sciences. Student’s section is informing readers about some curious facts of drug discovery, science, sports and other relevant fields. We look forward to seeing your submission and welcome comments and ideas you may have.

LETTER TO THE EDITOR.

NEWS UPDATE

△ **Fiber-optic pen helps see inside brains of children with learning disabilities** (18th June, 2013)

University of Washington researchers have designed a computer-interfaced drawing pad that helps scientists see inside the brains of children with learning disabilities while they read and write.

[Read more](#)

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△ **Chemical probe confirms that body makes its own rotten egg gas, h₂s, to benefit health** (18th June, 2013)

A new study confirms directly what scientists previously knew only indirectly: The poisonous "rotten egg" gas hydrogen sulfide is generated by our body's growing cells. Hydrogen sulfide, or H₂S, is normally toxic, but in small amounts it plays a role in cardiovascular health. In the new study, chemists developed a chemical probe that reacts and lights up when live human cells generate hydrogen sulfide, says chemist Alexander R. Lippert, Southern Methodist University, Dallas. The discovery allows researchers to observe the process through a microscope. [Read more](#)

△ **Getting Enough Sleep Could Help Prevent Type 2 Diabetes** (18th June, 2013)

Men who lose sleep during the work week may be able to lower their risk of developing Type 2 diabetes by getting more hours of sleep, according to Los Angeles Biomedical Research Institute (LA BioMed) research findings presented today at The Endocrine Society's 95th Annual Meeting in San Francisco. The study by Peter Liu, MD, PhD, an LA BioMed lead researcher, found that

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insulin sensitivity, the body's ability to clear glucose (blood sugar) from the bloodstream, significantly improved after three nights of "catch-up sleep" on the weekend in men with long-term, weekday sleep restrictions. [Read more](#)

△ **Timing of Calcium and Vitamin D**

Supplementation May Affect How Bone Adapts to Exercise (18th June, 2013)

Taking calcium and vitamin D before exercise may influence how bones adapt to exercise, according to a new study. The results will be presented at The Endocrine Society's 95th Annual Meeting in San Francisco. [Read more](#)

△ **New Resistance Mechanism to Chemotherapy in Breast and Ovarian Cancer** (18th June, 2013)

Between 5% and 10% of breast and ovarian cancers are familial in origin, which is to say that these tumours are attributable to inherited mutations from the parents in genes such as BRCA1 or BRCA2. In patients with these mutations, PARP inhibitors, which are currently in clinical trials, have shown encouraging results that make them a new option for personalised cancer treatment, an alternative to standard chemotherapy. [Read more](#)

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△ **Nanog Protein Promotes Growth of Head and Neck Cancer** (18th June, 2013)

A new study led by researchers at The Ohio State University Comprehensive Cancer Center -Arthur G. James Cancer Hospital and Richard J. Solove Research Institute (OSUCCC-James) has identified a biochemical pathway in cancer stem cells that is essential for promoting head and neck cancer. The study shows that a protein called Nanog, which is normally active in embryonic stem cells, promotes the growth of cancer stem cells in head and neck cancer. The findings provide information essential for designing novel targeted drugs that might improve the treatment of head and neck cancer. Normally, Nanog helps healthy embryonic stem cells maintain their undifferentiated, uncommitted (i.e., pluripotent) state. But recent evidence suggests that Nanog promotes tumor growth by stimulating the proliferation of cancer stem cells. [Read more](#)

△ **New Approach to Battling Tuberculosis**(18th June, 2013)

Scientists at the University of Medicine and Dentistry of New Jersey (UMDNJ)-New Jersey Medical School have now discovered a drug that cripples the TB bacteria by dissolving its protective fatty coating, a finding that could eventually be used to improve

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TB treatment in humans. The study has been posted online by *Nature Chemical Biology*. [Read more](#)

△ **Aspirin May Fight Cancer by Slowing DNA Damage** (18th June, 2013)

Aspirin is known to lower risk for some cancers, and a new study led by a UC San Francisco scientist points to a possible explanation, with the discovery that aspirin slows the accumulation of DNA mutations in abnormal cells in at least one pre-cancerous condition. [Read more](#)

△ **Treating Infection May Have Sting in the Tail, Parasite Study Shows**(18th June, 2013)

Researchers studying wild mice which typically carry multiple parasitic infections at once found that when these animals were treated for one type of bug, other infections they had tended to worsen. The findings suggest that infections that co-exist in our bodies can compete with each other to alter disease. Treating one infection may have unintended consequences by enabling others to gain a stronger foothold perhaps to the overall detriment of our health. Scientists from the University of Edinburgh treated wild wood mice for a gut worm infection over several weeks. During

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treatment, researchers monitored levels not only of the worm, but also tested the animals for dozens of other common parasite infections. During treatment, levels of the gut worm fell, but levels of other parasites in the gut increased. [Read more](#)

△ **Missing Enzyme Linked to Drug Addiction**(18th June, 2013)

According to an animal study conducted by Drew University of Medicine and Science in Los Angeles, a missing brain enzyme increases concentrations of a protein related to opioids pain-killer addiction. [Read more](#)

△ **New Medication Treats Drug-Resistant Prostate Cancer in the Laboratory**(18th June, 2013)

A new drug called pyrvinium pamoate inhibits aggressive forms of prostate cancer that are resistant to standard drugs, according to a study conducted in an animal model [Read more](#)

 **HEALTH AWARENESS**

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Helminth infection - a global health problem

One of the predominant disease in tropical and subtropical counties is Helminth infection, which not only affects the individuals but also eventually affect the countries' nutritional status and health policies. Soil-transmitted helminth infections are caused by different species of parasitic worms. More than 5 billion people are at risk of soil-transmitted helminthiasis—parasitic worm infections caused by the roundworm *Ascaris lumbricoides*, the whipworm *Trichuris trichiura*, and the two hookworm species *Ancylostoma duodenale* and *Necator americanus*. They are transmitted by eggs present in human faeces, which contaminate the soil in areas where sanitation is poor. Infected children are physically, nutritionally and cognitively impaired.

Global distribution and prevalence

- More than 1.5 billion people or 24% of the world's population are infected with soil-transmitted helminth infections worldwide. Infections are widely distributed in tropical and subtropical areas, with the greatest numbers occurring in sub-Saharan Africa, the Americas, China and East Asia.
- Over 270 million preschool-age children and over 600 million school-age children live in areas where these parasites are

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intensively transmitted, and are in need of treatment and preventive interventions.

(for global distribution

http://www.who.int/gho/neglected_diseases/soil_transmitted_helminthiasis/en/index.html)

Transmission

Soil-transmitted helminths are transmitted by eggs that are passed in the faeces of infected people. Adult worms live in the intestine where they produce thousands of eggs each day. In areas that lack adequate sanitation, these eggs contaminate the soil. This can happen in several ways:

- Eggs that are attached to vegetables are ingested when the vegetables are not carefully cooked, washed or peeled;
- eggs are ingested from contaminated water sources;
- Eggs are ingested by children who play in soil and then put their hands in their mouths without washing them.

In addition, hookworm eggs hatch in the soil, releasing larvae that mature into a form that can actively penetrate the skin. People become infected with hookworm primarily by walking barefoot on the contaminated soil.

There is no direct person-to-person transmission, or infection from fresh faeces, because eggs passed in faeces need about three weeks to mature in the soil before they become infective. Since

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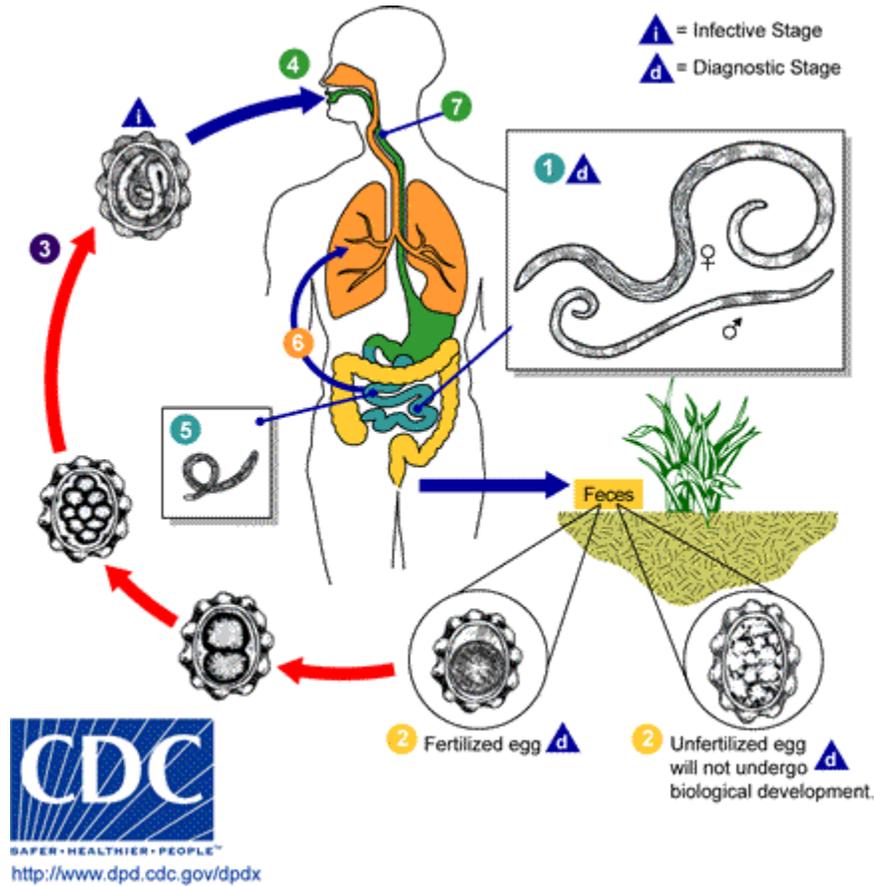
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these worms do not multiply in the human host, reinfection occurs only as a result of contact with infective stages in the environment.

Life cycle of major causative agents:

Life cycle of Ascaris lumbricoides

Ascaris lumbricoides is the largest nematode (roundworm) parasitizing the human intestine. (Adult females: 20 to 35 cm; adult male: 15 to 30 cm.)



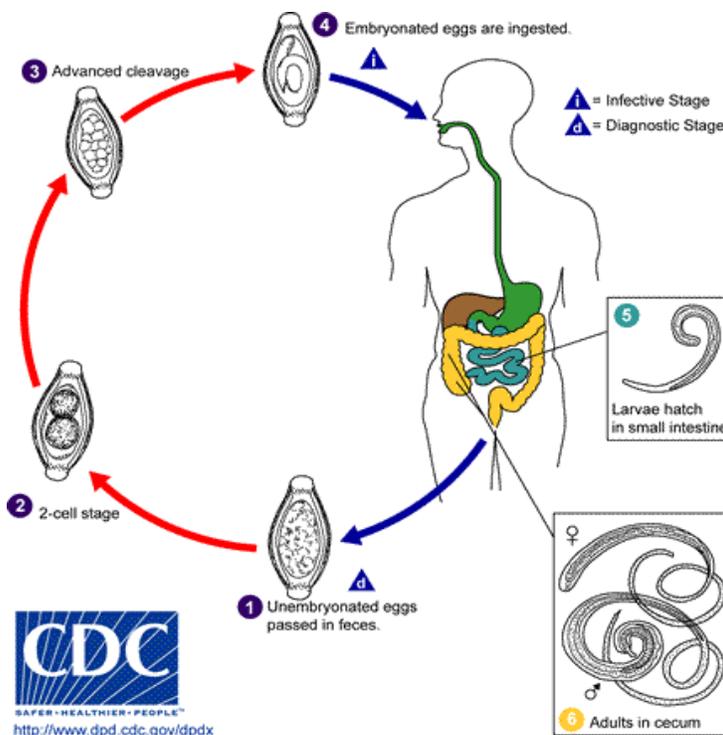
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Adult worms ❶ live in the lumen of the small intestine. A female may produce approximately 200,000 eggs per day, which are passed with the feces ❷. Unfertilized eggs may be ingested but are not infective. Fertile eggs embryonate and become infective after 18 days to several weeks ❸, depending on the environmental conditions (optimum: moist, warm, shaded soil). After infective eggs are swallowed ❹, the larvae hatch ❺, invade the intestinal mucosa, and are carried via the portal, then systemic circulation to the lungs ❻. The larvae mature further in the lungs (10 to 14 days), penetrate the alveolar walls, ascend the bronchial tree to the throat, and are swallowed ❼. Upon reaching the small intestine, they develop into adult worms ❶. Between 2 and 3 months are required from

ingestion of the infective eggs to oviposition by the adult female. Adult worms can live 1 to 2 years.

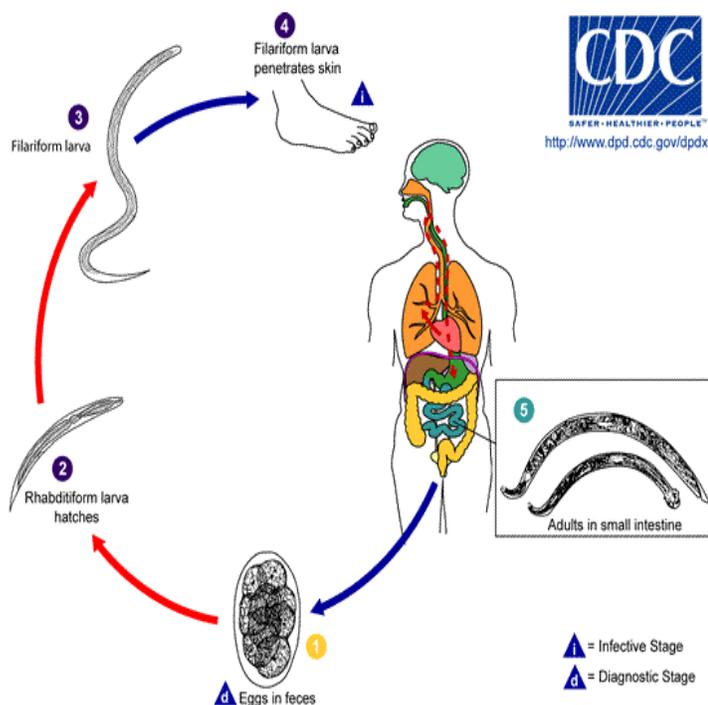
Life cycle of *Trichuris trichiura*



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The unembryonated eggs are passed with the stool ①. In the soil, the eggs develop into a 2-cell stage ②, an advanced cleavage stage ③, and then they embryonate ④; eggs become infective in 15 to 30 days. After ingestion (soil-contaminated hands or food), the eggs hatch in the small intestine, and release larvae ⑤ that mature and establish themselves as adults in the colon ⑥. The adult worms (approximately 4 cm in length) live in the cecum and ascending colon. The adult worms are fixed in that location, with the anterior portions threaded into the mucosa. The females begin to oviposit 60 to 70 days after infection. Female worms in the cecum shed between 3,000 and 20,000 eggs per day. The life span of the adults is about 1 year.

Life cycle of *Ancylostoma duodenale*



Eggs are passed in the stool ①, and under favorable conditions (moisture, warmth, shade), larvae hatch in 1 to 2 days. The released rhabditiform larvae grow in the feces

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and/or the soil ②, and after 5 to 10 days (and two molts) they become filariform (third-stage) larvae that are infective ③. These infective larvae can survive 3 to 4 weeks in favorable environmental conditions. On contact with the human host, the larvae penetrate the skin and are carried through the blood vessels to the heart and then to the lungs. They penetrate into the pulmonary alveoli, ascend the bronchial tree to the pharynx, and are swallowed ④. The larvae reach the small intestine, where they reside and mature into adults. Adult worms live in the lumen of the small intestine, where they attach to the intestinal wall with resultant blood loss by the host ⑤. Most adult worms are eliminated in 1 to 2 years, but the longevity may reach several years.

Some *A. duodenale* larvae, following penetration of the host skin, can become dormant (in the intestine or muscle). In addition, infection by *A. duodenale* may probably also occur by the oral and transmammary route. *N. americanus*, however, requires a transpulmonary migration phase.

Transmission

Soil-transmitted helminthes are transmitted by eggs that are passed in the faeces of infected people. Adult worms live in the intestine where they produce thousands of eggs each day. In areas

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that lack adequate sanitation, these eggs contaminate the soil. This can happen in several ways:

- eggs that are attached to vegetables are ingested when the vegetables are not carefully cooked, washed or peeled;
- eggs are ingested from contaminated water sources;
- eggs are ingested by children who play in soil and then put their hands in their mouths without washing them.

In addition, hookworm eggs hatch in the soil, releasing larvae that mature into a form that can actively penetrate the skin. People become infected with hookworm primarily by walking barefoot on the contaminated soil.

There is no direct person-to-person transmission, or infection from fresh faeces, because eggs passed in faeces need about three weeks to mature in the soil before they become infective. Since these worms do not multiply in the human host, reinfection occurs only as a result of contact with infective stages in the environment.

Morbidity and symptoms

Morbidity is related to the number of worms harboured. People with light infections usually have no symptoms. Heavier infections can cause a range of symptoms including intestinal manifestations (diarrhoea, abdominal pain), general malaise and weakness, and impaired cognitive and physical development. Hookworms cause chronic intestinal blood loss that can result in anaemia.

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Nutritional effects

Soil-transmitted helminths impair the nutritional status of the people they infect in multiple ways.

- The worms feed on host tissues, including blood, which leads to a loss of iron and protein.
- The worms increase malabsorption of nutrients. In addition, roundworm may possibly compete for vitamin A in the intestine.
- Some soil-transmitted helminths also cause loss of appetite and therefore a reduction of nutritional intake and physical fitness. In particular, *T. trichiura* can cause diarrhoea and dysentery.

The nutritional impairment caused by soil-transmitted helminths is recognized to have a significant impact on growth and physical development.

WHO strategy for control

The strategy for control of soil-transmitted helminth infections is to control morbidity through the periodic treatment of at-risk people living in endemic areas.

WHO recommends periodic drug treatment (deworming) without previous individual diagnosis to all at-risk people living in endemic areas. Treatment should be given once a year when the prevalence of soil-transmitted helminth infections in the community is over 20%, and twice a year when the prevalence of

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soil-transmitted helminth infections in the community is over 50%. This intervention reduces morbidity by reducing the worm burden. In addition:

- health and hygiene education reduces transmission and reinfection by encouraging healthy behaviours;
- provision of adequate sanitation is also important but not always possible in resource-poor settings.

The aim of control activities is morbidity control: periodic treatment of at-risk populations will reduce the intensity of infection and protect infected individuals from morbidity.

Periodic deworming can be easily integrated with child health days or supplementation programmes for preschool children, or integrated with school health programmes. In 2011, over 300 million preschool-aged and school-aged children were treated with anthelmintic medicines in endemic countries, corresponding to 30% of the children at risk.

Schools provide a particularly good entry point for deworming activities, as they allow easy provision of the health and hygiene education component such as the promotion of hand washing and improved sanitation.

WHO-recommended medicines

The recommended medicines – albendazole (400 mg) and mebendazole (500 mg) – are effective, inexpensive and easy to administer by non-medical personnel (e.g. teachers). They have

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been through extensive safety testing and have been used in millions of people with few and minor side-effects.

Both albendazole and mebendazole are donated to national ministries of health through WHO.

Global target

The global target is to eliminate morbidity due to soil-transmitted helminthiases in children by 2020. This will be obtained by regularly treating at least 75% of the children in endemic areas (an estimated 873 million).

People at risk:

Most risky targets are :

- preschool-aged children;
- school-aged children;
- women of childbearing age (including pregnant women in the second and third trimesters and breastfeeding women).

WHO recommends periodic treatment with anthelmintic (deworming) medicines, without previous individual diagnosis to all at-risk people living in endemic areas. Treatment should be given once a year when the prevalence of soil-transmitted helminth infections in the community is over 20%, and twice a year when the prevalence of soil-transmitted helminth infections in the community exceeds 50%. This intervention reduces morbidity by reducing the worm burden. In addition:

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- education on health and hygiene reduces transmission and reinfection by encouraging healthy behaviours;
- provision of adequate sanitation is also important but not always possible in resource-constrained settings.

Periodic deworming can be easily integrated with child health days or vitamin A supplementation programmes for preschool-aged children, or integrated with school-based health programmes.

Schools provide an important entry point for deworming activities, as they provide easy access to health and hygiene education components, such as the promotion of hand washing and improved sanitation.

Access to anthelmintic medicines

Donations of anthelmintic medicines are available through WHO to ministries of health in all endemic countries for the treatment of all children of school age.

[Life cycle of helminths courtesy of Centers of Disease Control and Prevention\(CDC\)](#)

DISEASE OUTBREAK NEWS

△ [Middle East respiratory syndrome corona virus \(MERS-CoV\) \(17th June, 2013\)](#)

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The Ministry of Health in Saudi Arabia has announced an additional three laboratory-confirmed cases with Middle East respiratory syndrome coronavirus (MERS-CoV). The first patient is a 42-year-old man with an underlying medical condition from the Eastern region, the second patient is a 63-year-old woman with underlying medical conditions from Riyadh region and the third patient is a two-year-old child with an underlying medical condition from Jeddah. [Read more](#)

△ **Yellow fever in the Democratic Republic of Congo** (14th June, 2013)

The Ministry of Health of the Democratic Republic of Congo (DRC) is launching an emergency mass vaccination campaign against yellow fever from 20 June 2013, following laboratory confirmation of six cases in the country on 6 June 2013. [Read more](#)

■ **FORTHCOMING EVENTS**

△ **A Teachers' Development Programme for School Teachers will be organized by GNIPST on 29th June, 2013 at college auditorium. The theme of the programme is "Recent Trends of Life Sciences in Higher Education".**

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△ Two short-term (2 weeks each) AICTE-sponsored refresher courses on: *Innovation and excellence in Pharmaceutical Sciences* for teaching staffs of the Indian Universities and colleges in QIP Nodal Cell (Pharmacy), Department of Pharmaceutical Technology, Jadavpur University, Kolkata-700 032 from 2nd July to 2^{9th} July, 2013. [Read more](#)

△ AICTE Sponsored Quality Improvement Programme on “*Production to Prescription - Opportunities for Innovation*” on MCOPS, Manipal University from 1-13th July, 2013. [Read more](#)

DRUGS UPDATES

△ **FDA approves a new silicone gel-filled breast implant** (14 June, 2013)

The U.S. Food and Drug Administration today approved the Memory Shape Breast Implant for women. [Read more](#)

△ **FDA approves Xgeva to treat giant cell tumor of the bone** (13 June, 2013)

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The U.S. Food and Drug Administration today expanded the approved use of Xgeva (denosumab) to treat adults and some adolescents with giant cell tumor of the bone (GCTB), a rare and usually non-cancerous tumor. [Read more](#)

CAMPUS NEWS

△ The following B.Pharm. final year students have qualified, GPAT-2013. We congratulate them all.

Amanpreet Kaur, Mohua Das,

Sourav Bagchi, Uddipta Ghosh Dastidar,

Siddarth Shah, Prapti Chakraborty,

Subhradip Roychoudhury, Soumyajit Das,

Mounomukhar Bhattacharjee.

△ GNIPST is now approved by AICTE and affiliated to WBUT for conducting the two years post graduate course (M.Pharm) in **PHARMACEUTICS**. The approved number of seat is 18.

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STUDENTS' SECTION

❖ WHO CAN ANSWER FIRST???

- ✓ *Which anthelmintic drug was first discovered at Smithkline Animal Health Laboratories in 1973 ?*
- ✓ *Which parasite is also known as old hookworm?*

Answer of Previous Issue Question:

A) Arthur Ashe B) Karl Landsteiner

- *Send your thoughts/ Quiz/Puzzles/games/write-ups or any other contributions for Students' Section & answers of this Section at gnipstbulletin@gmail.com*

EDITOR'S NOTE

I am proud to publish the 2nd issue of 26th Volume of **GNIPST BULLETIN**. On behalf of entire GNIPST members, contributors and the valuable readers of **GNIPST BULLETIN** I want to thank **Mr. Debabrata Ghosh Dastidar** who edited the bulletin last one year with excellence.

GNIPST BULLETIN now connected globally through *facebook account 'GNIPST bulletin'*

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I want to convey my thanks to all the GNIPST members and the readers for their valuable comments, encouragement & supports.

I am thankful to **Dr. Abhijit Sengupta**, Director of GNIPST and **Prof. Dipankar Chakraborty**, Registrar of GNIPST for their valuable advice and encouragement. Special thanks to **Dr. Prerona Saha** and **Mr. Debabrata Ghosh Dastidar** for their kind co-operation and technical supports.

An important part of the improvement of the bulletin is the contribution of the readers. You are invited to send in your write ups, notes, critiques or any kind of contribution for the forthcoming special and regular issue.

ARCHIVE

- The general body meeting of APTI, Bengal Branch has been conducted at GNIPST on 15th June, 2012. The program started with a nice presentation by Dr. Pulok Kr. Mukherjee, School of Natural Products, JU on the skill to write a good manuscript for publication in impact journals. It was followed by nearly two hour long discussion among more than thirty participants on different aspects of pharmacy education. Five nonmember participants applied for membership on that very day.

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- GNIPST is now approved by AICTE and affiliated to WBUT for conducting the two years post graduate course (M.Pharm) in *PHARMACOLOGY*. The approved number of seat is 18.
- The number of seats in B.Pharm. has been increased from 60 to 120.
- 2nd World Congress on Ga-68 (Generators and Novel Radiopharmaceuticals), Molecular Imaging (PET/CT), Targeted Radionuclide Therapy, and Dosimetry (SWC-2013) : On the Way to Personalized Medicine

Dates 28 Feb 2013 → 02 Mar 2013

Location: Chandigarh, India. [Details.](#)

- AICTE has sanctioned a release of grant under Research Promotion Scheme (RPS) during the financial year 2012-13 to GNIPST as per the details below:
 - a. Beneficiary Institution: Guru Nanak Institution of Pharmaceutical Science & Technology.
 - b. Principal Investigator: Dr. Lopamudra Dutta.
 - c. Grant-in-aid sanctioned :Rs. 16,25000/- only
 - d. Approved duration: 3 years
 - e. Title of the project: Screening and identification of potential medicinal plant of Purulia & Bankura districts of West Bengal with respect to diseases such as diabetes, rheumatism, Jaundice,

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hypertension and developing biotechnological tools for enhancing bioactive molecules in these plants.