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In Focus: Applications of Bioinformatics in Pharmaceuticals

Bioinformatics

Bioinformatics is an interdisciplinary research area that is the interface between the biological and computational sciences. The ultimate goal of bioinformatics is to uncover the wealth of biological information hidden in the mass of data and obtain a clearer insight into the fundamental biology of organisms. This new knowledge could have profound impacts on fields as varied as human health, agriculture, the environment, energy and biotechnology. The genomic era has seen a massive explosion in the amount of biological information available due to huge advances in the fields of molecular biology and genomics. Bioinformatics is the application of computer technology to the management and analysis of biological data. The result is that computers are being used to gather, store, analyse and merge biological data.

Importance of Bioinformatics

Sequence generation, and its subsequent storage, interpretation and analysis are entirely computer dependent tasks. However, the molecular biology of an organism is a very complex issue with research being carried out at different levels including the genome, proteome, transcriptome and metabolome levels. Following on from the explosion in volume of genomic data, similar increase in data have been observed in the fields of proteomics, transcriptomics and metabolomics. The first challenge facing the bioinformatics community is the intelligent and efficient storage of this mass of data and is then their responsibility to provide easy and reliable access to this data. The data itself is meaningless before analysis and the sheer volume present makes it impossible for even a trained biologist to begin to interpret it manually. Therefore, incisive computer tools must be developed to allow the extraction of meaningful biological information. There are three central biological processes around which bioinformatics tools must be developed:

- DNA sequence determines protein sequence
- Protein sequence determines protein structure
- Protein structure determines protein function

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Biological databases

Biological databases are archives of consistent data that are stored in a uniform and efficient manner. These databases contain data from a broad spectrum of molecular biology areas. Primary or archived databases contain information and annotation of DNA and protein sequences, DNA and protein structures and DNA and protein expression profiles. Secondary or derived databases are so called because they contain the results of analysis on the primary resources including information on sequence patterns or motifs, variants and mutations and evolutionary relationships. Information from the literature is contained in bibliographic databases, such as Medline. It is essential that these databases are easily accessible and that an intuitive query system is provided to allow researchers to obtain very specific information on a particular biological subject. The data should be provided in a clear, consistent manner with some visualisation tools to aid biological interpretation.

Specialist databases for particular subjects have been set-up for example EMBL database for nucleotide sequence data, UniProtKB/Swiss-Prot protein database and PDB a 3D protein structure database. Scientists also need to be able to integrate the information obtained from the underlying heterogeneous databases in a sensible manner in order to be able to get a clear overview of their biological subject. SRS (Sequence Retrieval System) is a powerful, querying tool provided by the EBI that links information from more than 150 heterogeneous resources.

Biological applications

The biological data is stored consistently and is easily available to the scientific community, the requirement is then to provide methods for extracting the meaningful information from the mass of data. Bioinformatics tools are software programs that are designed to carry out this analysis step. Factors that must be taken into consideration when designing these tools are:

- ✓ The end user (the biologist) may not be a frequent user of computer technology
- ✓ These software tools must be made available over the internet given the global distribution of the scientific research community. The EBI provides a wide range of biological data analysis tools that fall into the following four major categories:
 - Similarity Searching Tools
 - Protein Function Analysis
 - Structural Analysis
 - Sequence Analysis

Similarity Searching Tools: Homologous sequences are sequences that are related by divergence from a common ancestor. Thus the degree of similarity between two sequences can be measured while their homology is a case of being either true or false.

Protein Function Analysis: This group of programs allows you to compare your protein sequence to the secondary protein databases that contain information on motifs, signatures and protein domains.

Structural Analysis: This set of tools allows you to compare structures with the known structure databases. The function of a protein is more directly a consequence of its structure rather than its sequence with structural homologs tending to share functions.

Sequence Analysis: This set of tools allows you to carry out further, more detailed analysis on your query sequence including evolutionary analysis, identification of mutations, hydrophathy regions, CpG islands and compositional biases.

Market Growth of Bioinformatics

The Indian bioinformatics market has grown from US\$18m in 2003-04 to US\$35m in 2006-07, at a CAGR of 25%. Interestingly, owing to low local demand, US\$32m or about 90% of bioinformatics revenues

Indian Players

- Avestha Gengraine Technologies
- Metahelix Life Sciences Pvt. Ltd.
- Molecular Connections
- BioCon
- Helix Info Systems

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in India are derived from outsourcing activities. Local demand for bioinformatics services is low due to low investment in new drug discovery. The Indian bioinformatics outsourcing services opportunity is estimated to grow at 25% per annum during 2007-2010 raising its share of the global market from 1.4% in 2007 to 1.7% in 2010. These estimates are made based on the current plans of Indian vendors, as well as considering the impact of scarcity in human resources. Improved availability of skilled workers could help take growth rates higher. Similarly, positive actions by the Indian government to enhance IP rights could also help raise growth. The global bioinformatics market is currently estimated at about US\$1.4 billion. It is expected to grow at an average annual growth rate of 15.8% to reach nearly US\$3 billion by 2010.

The Indian bioinformatics industry comprises vendors with origins in the life sciences domain or the IT domain and estimate that there are about 45-50 companies active in the bioinformatics segment in India. Of these, about 35 are involved in the development of software tools, database solutions and providing bioinformatics services the remaining largely into marketing third party products and services.

Global Scenario

The Bioinformatics industry is highly fragmented and is seeing increased consolidation in the form of alliances and acquisitions with the action being primarily concentrated in the US and Europe. The overall competition has changed over the past few years with IT superpowers entering this industry as also Pharma majors. This is expected to continue in the same way. The industry is witnessing a lot more competition, with companies entering into strategic alliances to remain more competitive in the market. Issues such as data management, data standardization and patents continue to dominate the industry. With current revenues at around US\$840m, Scope forecasts the bioinformatics market to become more dominant in the future and increase to around US\$1.82 billion by the end of 2007. The growth rate is expected to stabilize at 17% per annum until 2007 as the beginning of post genomic era. Over the past years, bioinformatics has gained acceptance among number of markets especially in pharmaceutical, Biotechnology.

Major players in the bioinformatics industry include Accelrys, Compugen, Celera Genomics, IBM, Life Sciences Solutions, Incyte Genomics, Lion Bioscience, and Structural Bioinformatics among others. The biometric applications project an annual market growth of 15.8% or US\$3 billion by 2010 which is higher by 14.5% in comparison of 2003. With this the bioinformatics companies could consolidate data, make analysis and useful management and disseminate tools to help drug companies to curtail cost and time. The US represents the largest regional market for bioinformatics worldwide, followed by Europe, as stated by the new market research report on Bioinformatics. However, Asia-Pacific is projected to record the fastest growth over the analysis period. Japanese market is projected to post a CAGR of 13.5% during the analysis period. Segment wise, Biocontent represents the largest product segment in the global bioinformatics market. Bioinformatics Software represents the fastest growing product segment. Demand for Bioinformatics hardware is projected to rise by 9.5% during the analysis period. The Global Bioinformatics Market to reach US\$5.0 billion by 2015.

Outlook

India with its strengths such as; efficient and well qualified medical community, a huge patient and disease pool, representation of 15% of the global population by Indians. The cost of drug development has soared during the past ten years compelling pharmaceutical and biotechnology companies to look for new, smarter ways of conducting clinical research. Driven by mounting market pressures, companies are increasingly implementing outsourcing strategies to increase revenues through faster drug development. The combination of the growing trend by pharmaceutical companies to outsource a wider range of services, and the need to pass products through the testing and regulatory process in a rapid, cost-effective manner, has lead to skyrocketing growth of the CRO market.

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News Briefs

MARKETING

Americas

Doha: Expert says 15% Qataris are diabetics

Diabetes affects 15% of the Qatari population accounts for more than 10% of the healthcare expenditure, according an expert at the First International AACE-Gulf Conference on Diabetes. Diabetes is a major health problem affecting approximately 15% of Qatar population in addition to another 11% with impaired glucose tolerance, according to national diabetes survey carried out by Qatar Diabetes Association in 1999. More than 50% of it is related to complications such as coronary artery disease, stroke, end-stage renal disease, retinopathy and foot ulcers. Diabetes also effect the quality of life and economics since it is associated with high prevalence of affective disorders adversely impacting employment, absentees and work productivity.

Abu Dhabi: SEHA's nine ambulatory clinics to be ready by 2012

Seha has also confirmed that construction work is underway at a number of new strategically-located clinics. Moreover, construction works will begin early this year on new Ambulatory Healthcare Clinics at Shahama. The clinics are designed with patients complete wellbeing in mind. They feature the latest treatment, comforts and amenities, ensuring Abu Dhabi residents have access to health care on par with the best in the world. The company confident that the new Ambulatory Health care Clinics in Abu Dhabi and Al Ain will meet the increasing demand for premium health care services for both citizens and residents alike. Each clinic will offer a comprehensive list of services including dental, family medicine, maternal and child health, emergency care, prevention and screening, radiology and medical diagnostic imaging.

USA: Cartilage from Skin Cell Transformation

This is used fibroblasts isolated from adult mouse skin, and expressed proteins used to induce pluripotency along with a factor that promotes a chondrocyte fate. The resulting cells resembled chondrocytes and produced cartilage when injected into mice. This may be an important step toward a therapy that will allow the repair of cartilage injury using a patient's own skin cells. Hyaline cartilage, composed primarily of chondrocytes in an extensive extracellular matrix, makes up the embryonic skeleton and persists in adults at the ends of bones, where it provides shock absorption and lubrication of joints. Hyaline cartilage injury often results in the formation of the scar tissue fibro cartilage or even new bone formation leading to growth impairment or osteoarthritis.

Dubai: Healthcare City Launches Series of Health Education Videos

The health education videos to keep patients and the general public informed on current health issues that impact the community. The single-topic videos address syndromes such as diabetes, allergies, special needs, oral hygiene, women's health, IVF, eye care, beauty and skin and alternative medicine. The videos offer symptoms and treatments, as well as health tips and latest medical procedures. The Dubai Healthcare City is to ensure the well-being of the community through offering our patients best-in-class care in treating their medical conditions.

USA: Jordanian firm Hikma Pharmaceuticals to buy 30% stake in India's API

Jordanian firm Hikma Pharmaceuticals is to buy 30% stake in Indian API manufacturer Unimark Remedies Ltd. Unimark Remedies Ltd is based in Mumbai, and the deal is pegged at about Rs1.50 billion. That subsequently places the value of the Indian firm at about Rs5 billion. Hikma is a branded generic company that operates primarily in North America and the Middle East. Hikma's core products are anti-infectives, and the company has stated its intent to focus growth on cardiovascular, central nervous system, and diabetes. Unimark is a major manufacturer of key antibiotic products like cephalosporins, betalactams, semi-synthetic penicillin, anti-bacterial, cardiovascular drugs and oncology or anti-cancer products, tetracyclins and synthetic products and supplies to the top 10 generic companies in the world, along with multinationals like Pfizer.

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USA: Eisai opens sales, marketing operation in Netherlands

Eisai Europe Limited, a subsidiary of Eisai Co, has opened sales and marketing operation in its wholly owned subsidiary in Amsterdam, Netherlands. Eisai's sales and marketing operation will initially market epilepsy treatment drug Zonegran the Netherlands. Eisai Netherlands managing director says Eisai's entry into the country is aligned with the company's wider strategy of establishing a solid foundation in Europe. They currently have one product on the market and hope to have five products available in the coming months, boosting our presence in the market. This will allow Dutch patients' access to treatments not previously available to them and further supports Eisai's human health care mission to satisfy unmet medical needs and contribute to the health and well being of people worldwide.

USA: Pacira Pharma releases Exparel Phase 3 bunionectomy study results

Pacira Pharmaceuticals has released new data from a Phase 3 bunionectomy study evaluating the efficacy and safety of the intra operative administration of Exparel. Exparel is a novel, sustained-release analgesic formulation of bupivacaine HCl. The study demonstrated that the median time to first use of opioid rescue medication was 7.2 hours for patients treated with Exparel compared with 4.3 hours for patients treated with placebo. The Phase 3 multicenter, randomized, double-blind, parallel-group, placebo-controlled trial assessed 193 subjects in four US centers to determine the safety and efficacy of a single administration of Exparel for prolonged postoperative analgesia in subjects undergoing first metatarsal osteotomy.

Los Angeles: Protein to Protect Against Oxidative Stress Also Promotes Clogging Of Arteries

UCLA researchers have found that a protein that plays an important role in some antioxidant therapies may not be as effective due to additional mechanisms that cause it to promote atherosclerosis, or clogging of the arteries. The protein, called Nrf2, has been thought to be an important drug-therapy target for diseases such as cancer because it can induce chemo preventive activity by attaching to specific sequences of DNA, leading to the release of numerous antioxidant and anti-inflammatory genes and enzymes that can decrease or inhibit the effects of carcinogens. Researchers reasoned that Nrf2, with its potent ability to boost antioxidants, might also be useful in combating the cell and tissue damage, or oxidation that leads to atherosclerosis. Scientists found that the mice without any Nrf2 had lower levels of total cholesterol in the blood and lower amounts of cholesterol in the liver. The protein deficiency also led to reduced expression of the genes involved in synthesizing and storing fat and regulating glucose in the liver, which are part of the process of manufacturing cholesterol.

USA: Transforming Skin Cells into Cartilage

Hyaline cartilage, composed primarily of chondrocytes in an extensive extracellular matrix, makes up the embryonic skeleton and persists in adults at the ends of bones, where it provides shock absorption and lubrication of joints. Hyaline cartilage injury often results in the formation of the scar tissue fibro cartilage or even new bone formation leading to growth impairment or osteoarthritis. However, regeneration of cartilage might be possible if researchers can develop a method to generate new chondrocytes. The Osaka University Graduate School of Medicine, used fibroblasts isolated from adult mouse skin, and expressed proteins that have previously been used to induce pluripotency along with a factor that promotes a chondrocyte fate. This produced cells with traits that resembled chondrocytes and produced cartilage when injected into mice. The researchers believe this may be an important step toward a therapy that will allow the repair of cartilage injury using a patient's own skin cells.

Lexington: Home Research Identifies Drug Target for Prion Diseases

Plasminogen is a promising new target for the development of drugs to treat prion diseases in humans and animals. The reactions were conducted in the presence or absence of plasminogen. They also found that the natural replication of the prions was stimulated by plasminogen in animal cells. The diseases are characterized by certain misshapen protein molecules that appear in brain tissue. Normal forms of these prion protein molecules reside on the surface of many types of cells, including brain cells, but scientists do not understand what normal prion protein does. On the other hand, scientists believe that abnormal prion protein, which clumps together and accumulates in brain tissue, is the likely cause of the brain damage that occurs. Prion diseases are also known as transmissible spongiform encephalopathies, and include bovine spongiform encephalopathy in cattle.

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USA: Research Chemist Devises New Method to Quantify Protein Changes

The new method of analyzing and quantifying changes in proteins results from a common chemical process. The new findings could provide new insights into the effects of a highly destructive form of stress on proteins in various disease models, particularly cancer. This new technique allows us to home in on which proteins are modified to a significant extent during periods of stress and how that changes during disease progression. The new technique focuses on the process of cysteine S-hydroxylation, which plays a significant role in a number of events related to physiology in both health and disease, including the regulation of signaling proteins in various disease states. Chronic disease states such as cancer can involve the modification of signaling proteins through S-hydroxylation, but other housekeeping proteins may also be targets.

USA: Princeton Scientists Construct Synthetic Proteins That Sustain Life

Scientists have constructed for the first time artificial proteins that enable the growth of living cells. The genetic sequences never seen before in nature, and the scientists showed that they can produce substances that sustain life in cells almost as readily as proteins produced by nature's own toolkit. The construction of artificial genomes is capable of sustaining cell life. The relationship between biological processes on the molecular scale and processes at work are on a larger magnitude. Proteins are the workhorses of organisms, produced from instructions encoded into cellular DNA. The identity of any given protein is dictated by a unique sequence of 20 chemicals known as amino acids.

California: Cell Biosciences Launches New Platform for Multiplex Western Blot Detection

This combines highly-sensitive quantitative detection of multicolor fluorescent Western blots with key ease-of-use features aimed at simplifying the laboratory imaging process. Multiplex capability enables scientists to obtain more information in a single Western blot than chemiluminescence imaging or film, while also providing greater dynamic and linear range. Multiple proteins can be detected simultaneously and proteins with co-migration patterns are revealed immediately. FluorChem features intuitive software, touch screen operation and pre-optimized protocols that let researchers start imaging right out of the box. Using a unique browser-based interface, scientists can control and monitor image acquisition and access data remotely from any networked computer or mobile WiFi device. Chemiluminescent, colorimetric and UV-excited gels and blots can also be imaged on the system. The Company develops instrumentation systems, software and assay products that drive discoveries in fields ranging from fundamental protein research to biomarker discovery and personalized medicine.

VCU Findings May Help Explain Some Major Clinical Symptoms of Preeclampsia

The findings could lead to a treatment for pregnant women with preeclampsia, which is one of the most significant health problems in pregnancy and a leading cause worldwide of both premature delivery and of sickness and death of the mother and baby. Preeclampsia, a condition which occurs in one out of 20 pregnancies, is diagnosed when the mother develops high blood pressure and starts losing protein in her urine after 20 weeks of pregnancy. There is a significant increase in an enzyme called MMP-1 in blood vessels of women with preeclampsia and an imbalance in collagen-regulating genes that favored the breakdown of collagen. MMP-1 is an enzyme produced in tissues under conditions of inflammation that acts to break down collagen. The swelling experienced by pregnant women with preeclampsia is due to edema, which is a leakage of protein out of the blood vessels into surrounding tissues. Proteinuria is a leakage of protein through the blood vessels of the kidney and into the urine.

Protein Wields Phosphate Group to Inhibit Cancer Metastasis

A protein arrests an enzyme that may worsen and spread cancer. The same deactivation of the enzyme called EZH2 is necessary for the formation of bone-forming cells from the stem cells that make them and other tissues. EZH2 is over expressed in aggressive solid tumors and tied to cancer progression and metastasis. The CDK1 interferes with EZH2, reducing cell migration and invasion in breast cancer cell lines. EZH2 silences gene expression by attaching a methyl group, which consists of one carbon and three hydrogen atoms, to a histone protein that is intertwined with DNA and other proteins to compose chromosomes. Genes suppressed by this methylation include tumor suppressors that would otherwise prevent cancer growth and spread. EZH2-mediated methylation by attaching a different chemical group consisting of one phosphate and three oxygen atoms to EZH2, a process called phosphorylation.

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USA: Human Protein Improves Muscle Function of Muscular Dystrophy Mice

Duchenne Muscular Dystrophy is a fatal genetic mutation in about one of every 3,500 boys. They are unable to produce a protein called dystrophin that keeps muscles strong. Biglycan restores the muscle-strengthening presence of a protein called utrophin, which is normally prevalent only in very young children. Utrophin still exists in adults, but in fewer places and not where it can help muscular dystrophy sufferers who cannot produce dystrophin, which keeps adult muscles strong. The bloodstream draws utrophin to the cellular membranes of muscle cells. Much as utrophin does when it is present in fetuses, infants and toddlers, the protein works to help the cells build and retain their strength. The fibers in the muscle tissue of biglycan treated mice compared to untreated mice. Biologists recognize the fibers as indicators of recent tissue damage and repair, so a reduction in them suggests that the muscle tissue is suffering less damage.

California: Genesis Biopharma Raises US\$845,000 in Private Financings

The development-stage biotechnology company engaged primarily in the development of targeted cancer therapies. The foregoing press announcement contains forward-looking statements that can be identified expressions. Such forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause the actual results to be materially different from any future results, performance or achievements expressed or implied by such statements. In particular, management's expectations regarding future research, development and/or commercial results could be affected by, among other things, uncertainties relating to clinical trials and product development; availability of future financing; unexpected regulatory delays or government regulation generally; the company's ability to obtain or maintain patent and other proprietary intellectual property protection; and competition in general

USA: PET Scans Provide Insight into Fever-Induced Epilepsy in Children

FIRES, a recently named condition, occurs in previously healthy children who, after a brief fever, experience acute seizures that are resistant to medication and last for several weeks. After the seizures stop, children are left with severe cognitive dysfunction, mainly involving language, memory and behavior. The patients were given a neuropsychologic evaluation, a brain MRI and an 18F-FDG PET scan. Severe cognitive dysfunction was noted, and while the MRI tests showed no abnormalities for the patients, the PET scans reported significant cognitive impairment. Researchers compared the FIRES patients with a pseudo-control group of epilepsy patients with normal MRI and PET scan results. Using statistical parametric mapping, an objective approach to analyzing brain activity, the study exposed that the brain dysfunction was related to the epilepsy in the FIRES patients.

USA: Neurologists Use New Brain Scanning Device to Better Control Seizures

Epilepsy is a frustrating and often debilitating condition. Medication may control seizures in about 75% of cases, but neurologists say surgery is the only potential cure. Magnetoencephalography, or MEG, works by measuring the magnetic field created by brain activity. MEG can pinpoint the source of an epileptic seizure much more accurately than the traditional method of electroencephalography. Using a combination of MEG and MRI, neurosurgeons have a detailed brain map guiding them during surgery to remove just the damaged tissue, while preserving healthy cells. The MEG brain scanner may aid in the diagnosis and study of other disorders like dementia, migraines, Parkinson's disease, depression and traumatic brain injuries.

USA: New Molecular Imaging Technologies for Detecting Cellular Processes

The work carried out by these scientists has ranged from the initial design of an electronic architecture for gamma ray detectors to industry transfer of a complete scanner, after having adequately validated a prototype through experimental studies at the Gregorio Marañón Hospital. The electronic technology equipment designed by the researchers- which is in patent process-is based on molecular imaging, a type of biomedical imaging capable of detecting live cellular processes. These techniques differ from conventional medical imaging in that the information they show is function not form, which means that they are capable of showing the malfunctioning of an organ before the malfunction turns into an anatomical change. The characteristics of molecular imaging itself are already present in techniques for clinical use in humans such as nuclear medicine imaging or magnetic resonance imaging.

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USA: New Drug Protects Against Blood Clots Following Hip Replacement Surgery

The randomized, double-blind trial involved more than 5,000 patients and showed Apixaban reduced the risk of blood clots, without increasing bleeding side effects. The best current prevention efforts, blood clots still occur. Rivaroxaban is given orally in a fixed dose without the need for laboratory blood testing to monitor the anti-clotting effect. DVT affects at least 300,000 Americans each year. Most deep-vein blood clots occur in the lower leg or thigh. These blood clots can break off and travel through the bloodstream. When a clot travels to the lungs, the condition is called pulmonary embolism, a serious condition that can cause damage to the lungs and death.

USA: Smoking Causes Genetic Damage within Minutes after Inhaling

Smoking also is linked to at least 18 other types of cancer. Evidence indicates that harmful substances in tobacco smoke termed polycyclic aromatic hydrocarbons, or PAHs, are one of the culprits in causing lung cancer. PAHs in cigarette smoke cause DNA damage in humans. The scientists added a labeled PAH, phenanthrene, to cigarettes and tracked its fate in 12 volunteers who smoked the cigarettes. They found that phenanthrene quickly forms a toxic substance in the blood known to trash DNA, causing mutations that can cause cancer. The smokers developed maximum levels of the substance in a time frame that surprised even the researchers: Just 15-30 minutes after the volunteers finished smoking. Researchers opine that the effect is so fast that it's equivalent to injecting the substance directly into the bloodstream.

Cleveland: Orthodontists Diagnose Sleep Apnea More Easily with X-Rays

Doctors diagnosed him with sleep apnea, a chronic condition that causes him to stop breathing during sleep. Diagnosing the condition is difficult and often means staying at an overnight sleep lab. The studying whether the same X-rays teens get before getting braces will help determine if they're at risk for sleep apnea. If the bone sits higher, patients are not at risk for sleep apnea. If it falls lower, they are more likely to have the condition. The X-rays correctly identified 70% of teens with sleep apnea. There's no disadvantage in performing the X-ray other than a minimal dose of radiation, which is equivalent to a day in the sun. The most insurance covers the X-rays, which cost about US\$100. A sleep lab evaluation could cost thousands. Sleep apnea is a temporary suspension of breathing during sleep, which can have potentially serious consequences. People with sleep apnea can stop breathing for 10 to 30 seconds at a time, as many as 400 times a night.

New York: Psychiatrists Can Predict Onset of Alzheimer's with New EEG Test

Alzheimer's is a devastating illness affecting 4 million Americans and their families. The new computer software that converts the EEG scan into numbers, psychiatrists can more easily determine normal aging early signs of dementia. For instance, the left EEG shows the left and right sides of the brain are normal size, shape and similar between regions, suggesting no dementia. The right EEG, however, shows big differences between left and right sides -- indicating signs of future dementia. MRIs and PET scans can also detect future dementia, but they are much more invasive and expensive. The seven-year NYU study revealed the program is 95% accurate in predicting decline. The first signs of memory loss appear, can be screened with a less expensive, painless and easy-to-use tool called an EEG, combined with computer software. The ability to identify the disease at its earliest stages could enable treatment to delay or prevent its progress from memory loss into dementia.

California: Major Advance in MRI Allows Much Faster Brain Scans

The functional MRI study of the brain is performed; about 30 to 60 images covering the entire 3-D brain are repeated hundreds of times like the frames of a movie. The brain is a moving target, so the more refined you can sample this activity, the better understanding we will have of the real dynamics. The technique works on all modern MRI scanners, the impact of the ultrafast imaging technique will be immediate and widespread at research institutions worldwide. The faster scans are made possible by combining two technical improvements invented in the past decade that separately boosted scanning speeds two to four times over what was already the fastest MRI technique, echo planar imaging. Physical limitations of each method prevented further speed improvements.

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Colombia: Pre-Menopausal Chinese-American Women Have Greater Bone Strength

The team used a groundbreaking analytical technique developed at Columbia Engineering Individual Trabeculae Segmentation to analyze the microstructure and strength of the trabecular, or spongy bone, one of the two types of tissue that form bone. Trabecular bone is the most important site of osteoporosis-related fractures. This is an advanced 3-D imaging analysis technique that was conceived and developed in Dr. Guo's Bone Bioengineering Laboratory, and has a unique ability using high-resolution computed tomography images to quantify the plate and rod microstructure crucial to bone strength and osteoporotic fracture of bone. The advanced ITS morphological analysis developed at Columbia Engineering showcases a paradigm-shift technology in measuring bone micro-architecture.

Europe

UK: Bioactive Compounds in Berries Can Reduce High Blood Pressure

High blood pressure is one of the major cardiovascular diseases worldwide and leads to stroke and heart disease and costs more than US\$300 billion each year. Around a quarter of the adult population is affected globally including 10 million people in the UK and one in three US adults. Bioactive compounds in blueberries called anthocyanins offer protection against hypertension. Compared with those who do not eat blueberries, those eating at least one serving a week reduce their risk of developing the condition by 10%. Anthocyanins belong to the bioactive family of compounds called flavonoids and are found in high amounts in blackcurrants, raspberries, aubergines, blood orange juice and blueberries. Other flavonoids are found in many fruits, vegetables, grains and herbs. The flavonoids present in tea, fruit juice, red wine and dark chocolate are already known to reduce the risk of cardiovascular disease.

Asia-Pacific

Japan: Elastography Helps Identify Patients Who Need Biopsy

Ultrasound elastography indicates tissue softness, can help predict cancer in patients with BI-RADS category 4 masses. Because malignant tumors predominantly are harder than benign tissues, this technique significantly improves the differentiation between benign and malignant tissue. In an analysis of 115 breast masses that were recommended for biopsy. The elastography was 79% accurate in identifying cancer. Ultrasound elastography provides radiologists with elasticity scores, with lower scores meaning that the mass contains softer tissue.

India: Merck opens its new Application and Technology Centre

Merck offers customized application and technology solutions to its customers in fields ranging from drug discovery to automobile and decorative paints. The Indian pharmaceutical industry had been characterized by a core competency in generics' manufacturing and relatively immature capabilities in R and D. This outlook has evolved substantially since the 1990s and Indian companies have been making investments towards expanding drug discovery and development capabilities. The facility is equipped with state-of-the-art application, demonstration and quality control laboratories that meet stringent international standards this Centre will open up new vistas in water and chemical analysis capabilities in India.

India: Biocon's oral insulin drug for diabetes shows encouraging results

The totals of 264 patients were enrolled at multiple centers across India in the double-blind placebo controlled trial. Patients poorly controlled on meteoric were randomised to receive either IN-105 or placebo. Initial data analyses show that IN-105 did not meet its primary end point of lowering HbA1c levels by 0.7% compared to placebo although an unexpectedly high placebo response was also observed. Post hoc analysis of self monitored blood glucose levels in the IN-105 arm and the placebo arm indicated large reductions in pre-meal glucose levels in the placebo arm strongly suggestive of behavioral modification and which might have confounded the primary endpoint outcome.

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India: India invents drug to ward off side-effects of cancer treatment

The drug named Dioxy de Glucose is the first of its kind drug the world over. The drug has to be administered before radiotherapy and acts by entering the Cancer-affected cells and informed that the drug would lessen the period of radiotherapy which in turn would reduce the post-chemotherapy instances of vomiting, convulsions, hair loss, loss of appetite and extreme tiredness by 90%. The chemotherapy and radiotherapy in cancer treatment make use of gamma radiation, which cause side-effects, making many decide to live the rest of the life with the disease and not to go for the treatment. Keeping the pain that a person has to go through post-therapies, scientists at the Institute of Nuclear Medicine and Allied Sciences and Gwalior-situated DRDO branch invented this drug, which is to be consumed by the patient 30 minutes before the radiotherapy, which then starts mixing in the blood.

India: Ranbaxy's South African arm bags US\$133m order

Anti-retroviral drugs are meant for treatment of infection by retroviruses, primarily HIV. The South African government floated a 4.28 billion rand national ARV drugs tender earlier. Sonke Pharmaceuticals, a joint venture between Ranbaxy Pharmaceuticals and Community Investment Holding, is the second largest local supplier of generic ARV medication in South Africa. The medicines will be manufactured in South Africa and at Ranbaxy facilities in India. They are humbled to be given this responsibility to produce, supply and distribute affordable ARVs in South Africa. As a socially responsible global pharmaceutical company, and are committed to the cause of alleviating the suffering due to HIV/AIDS and to bring high quality medication to those who need it the most.

India: Sharon Bio-Medicine to set up new plant in Maharashtra

The new plant will facilitate global marketing of the company's products, says in a statement. The company has been allotted 10 acres of land at MIDC, Chincholi, in Sangli district of Maharashtra, it added. However, the firm is yet to obtain environment clearance for starting construction activity, it added. The company manufactures active pharma ingredients (API), intermediate of APIs and formulations. And has three R and D units located at MIDC, Taloja, near Navi Mumbai and a toxicology laboratory at Dehradun, Uttarakhand.

India: Fortis Malar Reported 93% Revenue Growth

The company continued its growth in every stream of medicine, and is showing rapid movement in terms of volume and revenues in every major specialities including cardiac, neuro, ortho, renal, gyneac, and internal medicine. Commenting on the results, Chairman, Fortis Malar Hospitals Limited, stated that the company has grown over the last two years in a significant manner fuelled by investments in new medical programmes, renovated infrastructure, modernization and improvement in patient care services. This is in line with Fortis' approach to distinctive patient care. Operating Profit for the year ended March 31, 2010 stands at Rs68m and for the quarter ended March 31, 2010 stands at Rs14m. The profit after Tax for the year ended March 31, 2010 stands at Rs35m and for the quarter ended March, 31, 2010 stood at Rs6m.

India: Drug-eluting Device Angioplasty is The Latest Medical Development

Angioplasties with simple balloons, bare-metal stents and drug-eluting stents are commonly practiced. Now drug-eluting device are another option for doctors and patients. This drug-eluting device is coated with paclitaxel. The balloon is inflated for about 30-45 seconds inside the narrowed artery, and the paclitaxel which has a natural attraction to cells and quickly moves from the surface of the balloon into the arterial cells. Not only does the drug-eluting balloon device avoid a second layer of metal inside the artery, the carrier that is used to bind paclitaxel to the balloon is iopromide, a commonly used contrast agent. This avoids concerns about the artery's reaction to the polymers used to bind paclitaxel and other anti-restenosis medications to drug-eluting stents.

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OPERATIONS

Americas

USA: Early Development of Anti-HIV Neutralizing Antibodies

Antibodies bind to the surface of HIV and prevent it from attaching itself to a cell and infecting it. However, a fraction of people infected with HIV develop broadly neutralizing antibodies capable of preventing cell-infection by diverse HIV isolates, which are the type of antibodies researchers wish to elicit by vaccination. The people who develop broadly-reactive neutralizing antibodies which are about 30% of those infected tend to have a healthier immune system that differs from others who don't develop those antibodies. The new findings show that these antibodies are generated much sooner than previously thought, in some cases as soon as a year after infection. These broadly-reactive neutralizing antibodies don't develop simply by chance and we can work to understand what makes this 30% of the HIV-infected population different.

USA: Airborne Pathogens Can Induce Mad Cow Disease

The prion is the infectious agent that caused the epidemic of mad cow disease, also termed bovine spongiform encephalopathy. The prions can be transmitted through contaminated surgical instruments and, more rarely, through blood transfusions. The consumption of food products made from BSE-infected cows can also induce the disease that is responsible for the death of almost 300 people. They found that inhalation of prion-tainted aerosols induced disease with frightening efficiency. Just a single minute of exposure to the aerosols was sufficient to infect 100% of the mice. The prions appear to transfer from the airways and colonize the brain directly because immune system defects known to prevent the passage of prions from the digestive tract to the brain did not prevent infection.

USA: Master Switch for Key Immune Cells in Inflammatory Diseases Discovered

Inflammatory responses are an important defence that the body uses against harmful stimuli such as infections or tissue damage, but in many conditions, excessive inflammation can itself harm the body. In rheumatoid arthritis, the joints become swollen and painful. Cells of the immune system called macrophages can either stimulate inflammation or suppress it by releasing chemical signals that alter the behaviour of other cells. A protein called IRF5 acts as a molecular switch that controls whether macrophages promote or inhibit inflammation. The production of IRF5 in macrophages might be an effective way of treating a wide range of autoimmune diseases, such as rheumatoid arthritis, inflammatory bowel disease, lupus, and multiple sclerosis.

USA: Blood Pressure Control System Found in Kidney's Structural Units

Scientists at the University of Texas Health Science Center San Antonio have reported how this essential function of the distal nephron is regulated. They demonstrated that sodium handling by the distal nephron is under the control of a local regulatory system. Loss or dysfunction of this system leads to hypertension resulting from improper salt retention by the kidneys, the scientists found in mouse studies. These studies provide the first unequivocal evidence of a blood pressure control system in the distal nephron of the kidney and turns out control of sodium re-absorption by this system is as important to normal blood pressure regulation as is a better-understood system, called the renin-angiotensin-aldosterone system, which works outside the kidney. Many medications that treat high blood pressure target salt handling in the kidney. The research was funded by the US National Institutes of Health and American Heart Association and included colleagues at the University of Southern California.

USA: Drug Reduces the Increase in Fear Caused by Previous Traumatic Experiences in Mice

Mice previously exposed to traumatic situations demonstrate a more persistent memory of fear conditioning acquired by associating an acoustic stimulus with an aversive stimulus and lack the ability to inhibit this fear. This phenomenon is similar to that of people who suffer from Post-Traumatic Stress Disorder, an anxiety disorder which appears after being exposed to highly traumatic situations, such as a violent attack, a natural disaster or physical abuse. The enhancement of this new learning is the result of 7, 8-Dihydroxyflavone activating the TrkB receptors in the brain, probably those found in the amygdala,

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which are essential for emotional learning and memory. Chronic administration of foods rich in flavonoids in lab animals has demonstrated neuroprotective effects in aged rodents, but the activation of TrkB receptors produced by these foods is probably low compared to the effects of 7, 8-Dihydroxyflavone.

USA: Triple Amount of Genetic Information from Newborn Blood Spot Screenings

Blood is usually collected through a heel prick 24 to 48 hours after birth and is placed on the cards, which may be archived after screening. Although genetic material in blood from Guthrie cards has been presumed to be degraded because of varying storage conditions, VARI researchers were able to detect more than 3,000 activated genes in each sample in a 2009 study, and recently, they were able to detect three times that amount using the new method. The mRNA is reasonably well preserved in archived filter paper blood spots, whether frozen or not, opens up a very important avenue for clinical and translational research, especially in child health, because the largest such archive is samples used for newborn genetic screening. Messenger ribonucleic acid or mRNA is a molecule that carries instructions from DNA to protein making structures in cells.

USA: Antibiotics Best Treatment for Ear Infections in Toddlers

Most American children with middle-ear infections are treated with antibiotics. But for children with mild symptoms, US clinical practice guidelines generally recommend watchful waiting, reserving antibiotics for children whose symptoms do not improve with time. Previous trials comparing the two strategies yielded conflicting results, chiefly, say the authors of the current study, because of differences among the trials in the definition of middle-ear infections. They found that those children in the treatment group had a significant reduction in both the severity and duration of their symptoms compared with those in the placebo group. The study authors caution that these results must be weighed against concerns about the side effects of antibiotics and the potential emergence of antimicrobial resistance.

USA: Pandemic H1N1 Influenza Vaccine Effective in 2009-10 Flu Season

Patients consulting a participating practitioner for influenza-like-illness had a nasal or throat swab taken within eight days of symptom onset. Individuals were considered vaccinated if they had received a dose of the vaccine more than 14 days before the date of onset of influenza like illness and unvaccinated if they were not vaccinated at all or if the vaccine was given less than 15 days before the onset of symptoms. The pandemic influenza vaccination effectiveness in those vaccinated less than 8 days, those vaccinated between, and including, 8 and 14 days and those vaccinated more than 14 days before onset of symptoms compared to those who had never been vaccinated. The authors then used statistical models to measure the effectiveness of pandemic influenza vaccine according to three age groups (< 15, 15-64, and 65+ years of age) and the presence of chronic diseases.

USA: Two Medicines Taken Together Improve Control of Blood Pressure

The two medicines can be incorporated into a single pill, simplifying things for patients who will still only have to take one pill. But by including two medicines in the same pill, they are taking a much more effective medicine with fewer side effects. The Accelerate study breaks the mould for treating hypertension. Most patients can now be prescribed a single combination pill and know that they are optimally protected from strokes and heart attacks. Currently there are almost 10 million people in the UK with high blood pressure and effective treatment is known to substantially reduce the risk of stroke and heart disease. The investigators believe these important findings could change clinical practice and affect the future treatment of blood pressure for millions of people in the UK.

USA: Race Plays Role in Weight-Related Counseling among Obese Patients

Obesity is defined as having a body mass index greater than or equal to 30kg/m² and is an important risk factor for mortality and morbidity. In the US, blacks are disproportionately affected by obesity and are at an increased risk for a number of chronic diseases associated with obesity, such as cardiovascular disease, hypertension and diabetes. The black and white obese patients to their black and white physicians from the specialties of general family practice and general internal medicine, the relationship between

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doctor-patient race concordance and weight-related counseling, logistic regression was used to model the outcome variables of interest. In addition, tests were used to statistically compare whether physicians of each race provided counseling at different rates for obese patients of different races.

USA: Micro RNAs Could Increase the Risk of Amputation in Diabetics

The research group has shown in an experimental cell study that conditions mimicking diabetes and a lack of blood supply to a tissue increased a particular miRNA and impaired the ability of endothelial cells, which line the interior surface of blood vessels. Micro-RNAs are small sections of ribonucleic acid that can inhibit many genes. Alternatively, slowing down miRNA-503 improved the capability of endothelial cells to duplicate and form into networks of small blood vessels. The researchers showed that microRNA-503 reduces cell growth and prevents the formation of blood vessels by direct binding and inhibition of cyclin E1 and Cdc25 mRNA. The miRNA can regulate many genes, they represent an exciting new target to correct diseases that have complex underlying mechanisms, like diabetes, rather than trying to target one specific gene.

USA: WHO Says Haiti's Cholera Outbreak Has Not Peaked

Haiti cholera outbreak that has claimed 3,651 lives has not peaked, the World Health Organisation. The peak has not been reached because it would require the mortality rate to drop to less than 1% from 2.2% at the moment. That would take several weeks. The epidemic, which began in October 2010, spawned deadly anti-UN riots in November as some turned their anger on peacekeepers from Nepal accused of bringing the disease into the country.

USA: Australia on High Alert for Disease Outbreak after Floods

Australian medical officials braced for rampant disease in the country's swamped northeast, with filthy floodwaters harbouring sewage, dead animals and dangerous debris. Dozens of towns have been inundated including large areas of Brisbane, Australia's third-largest city, in flooding across an area twice the size of Texas, or France and Germany combined. More than 100,000 Brisbane homes were without power and fresh water supplies had been cut or compromised in some areas, while raw sewage spilled into waterways from submerged homes across the state of Queensland. Infections may vary from ingestion varieties including gastroenteritis and parasitic infestations causing vomiting, diarrhoea, and abdominal pains to systemic infections.

Gaza: Hamas blames PA for Gaza medical shortages

Gaza is lacking about 40% of basic medicines, the Hamas health minister accusing the Palestinian Authority of withholding key stocks. The health situation in Gaza is very difficult, if there is any new Israeli war the situation will be catastrophic, saying the health services were missing 182 out of 450 basic types of medicine. Increasing rocket fire from Gaza into southern Israel has raised fears of a new Israeli offensive on the enclave, akin to its 2008-2009 offensive which killed 1,400 Palestinians in 22 days, more than half of them civilians. A source within the Hamas government blamed the shortage on a politically motivated decision within the Palestinian Authority, which is controlled by the rival Fatah movement. There was no immediate response from the Ramallah-based Palestinian Authority to the allegations.

Europe:

England: High-Density Lipoprotein Levels in Protecting Against Heart Disease

Atherosclerosis is a component of heart disease, occurs with a build-up along the artery wall of fatty materials such as cholesterol. Cholesterol efflux capacity, an integrated measure of HDL function, is a direct measure of the efficiency by which a person's HDL removes cholesterol from cholesterol-loaded macrophages, the sort that accumulate in arterial plaque. The Recent scientific findings have directed increasing interest toward the concept that measures of the function of HDL, rather than simply its level in the blood, might be more important to assessing cardiovascular risk and evaluating new HDL-targeted therapies. The relationship was noted between cholesterol efflux capacity and carotid intima-media thickness both before and after adjustment for the HDL cholesterol level.

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Asia-pacific:**India: New formulation of Cumberland's Acetadote injection approved**

The Food and Drug Administration approved a new formulation of Cumberland Pharmaceuticals Inc.'s Acetadote (acetylcysteine) injection, which is indicated to prevent or reduce potential hepatic injury following acetaminophen overdose. The news sent company shares up 18.2%. The second-generation, preservative-free formulation contains no ethylene diamine tetracetic acid and no other stabilization or chelating agents, Cumberland stated also has a shelf life of 30 months compared with a shelf life of 24 months for the original formulation. The new formulation is intended to replace the currently marketed version. The original formulation is set to lose its orphan drug marketing exclusivity this month, and approval of the second-generation product provides an avenue for Cumberland to secure additional product exclusivity.

India: GE Healthcare Expands India Manufacturing Operations

GE Healthcare has expansion of its Bangalore manufacturing operations in its endeavour to locally serve its customers, leveraging the price-value equation in India. GE Healthcare also rolled out its first CT system manufactured in India. Signaling an aggressive approach in making India a strong hub for GE globally, the company declared its plans to manufacture Gold Seal HiSpeed single and dual slice systems exclusively in India for both domestic and export worldwide. The manufacturing plant in Bangalore has the capacity to produce upto 300 HiSpeed units in one year with an option to increase capacity further. Designed through Six Sigma quality methodology, HiSpeed Dual CT system swears to increase productivity; optimise patient flows and improve access to a large number of advanced clinical applications.

India: Fortis Gives New Life to Octogenarian with DVT

Doctors at Fortis Hospitals, Mulund, and Mumbai treated an exceptional case of Deep Vein Thrombosis and hip fracture in the same leg of an obese octogenarian lady. A filter was put into the IVC pre-operatively so that even if the blood clot was to break off and flow towards the lung, the filter would trap it before it would compromise the lung circulation. After insertion of the IVC filter, the patient was taken for the orthopaedic line of treatment. Minimally-invasive technique of per-cutaneous insertion of Proximal Femoral Nail was used to fix the fracture without opening the fracture site- which meant minimal blood loss, minimal tissue trauma and no disturbance of the fracture hematoma. A high-frequency, high resolution C-arm Image Intensifier was used which gave clear images of the fracture fragments and made fracture reduction and fixation easy and accurate.

India: Suven Life Sciences gets two patents for their NCEs

These patents are valid until 2027, the company announced in a statement. With these new patents, Suven now has a total of 11 granted Indian Patents on NCEs. The products will be helpful in treatment of diseases like Alzheimer's disease, Attention deficient hyperactivity disorder, Huntington's disease, Parkinson and Scizophrenia. Products of these inventions may be out-licensed at various phases of clinical development, it added.

India: Pharmacist fraternity an indispensable part of healthcare

Pharmacists for better Healthcare' held here as a part of the three day 62nd Indian Pharmaceutical Congress, Doctor defined the Pharmacy Vision 2020 as making the pharmacist an established medical expert. However, felt it was not going to be easy to achieve that goal and shared his fears about the challenges in this field. Citing appalling statistics on the state of healthcare in India emphasised on need to concentrate on primary healthcare. With an ageing population and a massive middle class, India is perfectly ready to handle the growth. Low production price, cheaper real estate and presence of skilled labour will help in producing huge volumes of cheaper drugs.

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India: Biotech products strengthen Lincoln Pharma position

LPL tied-up with Human BioSciences Inc., Maryland in USA last year for the exclusive marketing and distribution of two technologically advanced Collagen Bio-tech products -- Medifil and Skin Temp. Since its entry into the Indian market, the products have demonstrated to be at least 50% faster in healing wounds, with a 50% reduction in frequency dressing and no scar formation compared to existing products. This has led to Medifil and Skin Temp acquiring 22% market share.

MERGERS AND ACQUISITIONS

Americas

USA: Johnson Medical tied up with Trivitron to Manufacture Modular Ots

Medical technology solutions provider Trivitron Healthcare announced its alliance with Johnson Medical, Sweden. Through this tie up, Johnson Medical will manufacture modular OTs and pendants by setting up its manufacturing facility in Trivitron Medical Technology Park. Johnson Medical, Sweden is one of the leading global medical solution providers specialising in operating room solutions which includes of medical gas piping, sterile operating rooms, heat ventilation and air conditioning and other services. Trivitron has set up South Asia's first medical technology park to manufacture medical technology products in a cost effective manner in India for India and emerging markets of the world.

USA: UAS Labs enters agreement with Valensa and Parry to launch new Probiotic product

UAS Laboratories has entered into an agreement with Valensa and Parry Nutraceuticals to launch Probiogreen, a new product combining premium DDS Probiotics with Parry organic spirulina. Tests with spirulina and Lactobacillus showed that spirulina can stimulate the growth of Lactobacillus. Probiogreen will be available as a finished product or as a raw material. Possible applications include, supplement powders, smoothie mixes, beverages, and supplements. Parry spirulina has received GRAS status for its *Arthrospira platensis* which is produced in accordance with cGMP and is certified organic by USDA NOP, Naturland-Germany, Ecocert-France, OCIA-IFOAM standards. Spirulina, a microscopic aquatic organism, has a long history of human consumption. The health benefits are widely researched and show promise in many age-related health conditions like Age-Related Macular Degeneration, type 2 diabetes, non-alcoholic fatty liver disease, neurodegenerative disorders and cardiovascular disease.

USA: Sanofi-aventis Acquires from Ascendis Pharma Worldwide Rights Drug-Delivery Technology

The technology creates transient bonds between larger molecules such as proteins and peptides, including insulin, and a carrier. This allows for tailor-made release profiles, with no initial burst and high drug load formulations. The TransCon Linker technology has shown promising results in preclinical studies in delivering insulin. Ascendis Pharma's clinically proven prodrug technology platform, TransCon, is a proprietary technology enabling linker-assisted transient conjugation of peptides, proteins and small molecules to various carriers such as hydrogels. The technology utilizes Ascendis Pharma's proprietary TransCon Linker families, which are a diverse group of structures with inherent chemical self-cleaving properties, making drug release independent of enzyme activity and tissue conditions.

San Francisco: Sutro Biopharma Partnership with Pfizer for Peptide-Based Therapeutics

The company develops and designs novel protein therapeutics and biosuperiors that have site-directed modifications, including modifications incorporating non-natural amino acids. Sutro's biochemical protein synthesis technology opens up opportunities to create protein therapeutics that cannot be produced using conventional methods. Sutro's technology enables the rapid and systematic exploration of many protein drug variants to identify drug candidates. Once identified, the company can efficiently scale production to commercial levels. In addition to developing its own drug pipeline, Sutro is collaborating with select pharmaceutical and biotechnology companies in the development of novel protein therapeutics that cannot be designed, produced or studied with current technologies.

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USA: Pfizer agrees to collaborate with Sutro Biopharma

Pfizer Inc., the world's largest drugmaker, has reached an agreement with privately held Sutro Biopharma to collaborate on the research and development of biotechnology drugs. Financial terms of the deal were not disclosed. New York-based Pfizer will make an upfront payment to Sutro, which also will receive research funding and could get development milestone payments and sales royalties. Sutro Biopharma is based in South San Francisco. The Company given a statement the deal gives the company access to peptides that have been difficult to produce using conventional technology. Pfizer fell 11 cents to US\$18.07 in afternoon trading, while broader trading indexes also were down slightly.

USA: Aventis Pharma Ltd joint venture in vaccine manufacturing

Aventis Pharma will sell its stake to Novartis Pharma AG, a nominee of joint venture partner Novartis Vaccines and Diagnostics Inc, a unit of Swiss drug maker Novartis AG. The deal is expected to conclude before 31 December 2010. The deal is expected to close before December 31, 2010. Aventis Pharma holds 4.9 million shares in Chiron, while the balance 51% is held by Novartis. Aventis Pharma has agreed to continue to provide certain utilities and services to the Ankleshwar plant of CBVPL for a period of three years from the date of closing on mutually agreed terms. CVBPL manufactures the anti-rabies vaccine Rabipur at its plant in Ankleshwar, which was until February 2009 distributed in India by Aventis and presently distributed by Novartis Healthcare.

USA: Orexo, Invida sign supply pact

Orexo and Invida Group have entered into a licensing and distribution agreement, for Orexo's cancer pain treatment, Abstral in Asia Pacific region. As per the terms of the agreement, Orexo is expected to take up the responsibly for supplying Abstral product to Invida. Invida will be responsible for all regulatory, medical, marketing and sales activities in eleven countries across Asia Pacific, excluding China where the product is already partnered. Financial terms of the agreement were not disclosed. Invida president and CEO opines this alliance will allow them to leverage their suite of capabilities to meet the growing demand for new, effective pain treatments in this region, and aligns with the goal of forging true partnerships, in which we are able to operate across the full value chain to bring pharmaceutical products into the Asia Pacific markets.

USA: IDEX agrees to acquire Microfluidics International

IDEX has entered into a definitive merger agreement to acquire Microfluidics International, a manufacturer of laboratory and commercial equipment used in the production of micro and nano scale materials for the pharmaceutical and chemical markets. Microfluidics product and service offerings are expected to enhance IDEX's micro fluidics and micro particle technology position. Microfluidics will operate as a stand-alone business within the IDEX Fluid and Metering segment. Microfluidics leading technology in particle size reduction and nano-particle creation adds enabling technology to one of their key platforms supporting pharmaceutical research and production. Combining Microfluidics with our Quadro and Fitzpatrick pharma platform will allow for significant growth opportunities across the globe.

Asia-Pacific**India: Synageva Biopharma Corp And to-BBB Collaborate On Brain Drug Delivery Diseases**

Synageva Biopharma Corp. and to-BBB technologies BV, the Dutch drug brain delivery company, have entered into a research collaboration to evaluate the potential of transporting therapeutic proteins across the blood-brain barrier into the central nervous system. The blood-brain barrier, a protective filter for the CNS, can be an obstacle for protein therapeutics and prevent these treatments from reaching their site of action within the CNS. A number of rare diseases that could benefit from protein therapeutics have a CNS component and require the therapies to be transported across the blood-brain barrier. This research collaboration will be the basis for a development program for therapies for multiple such rare diseases, including Liposomal Storage Diseases. The Company has developed a pipeline of novel therapeutics for under-served populations and has assembled a team with a proven record of bringing orphan therapies to patients.

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India: AVI BioPharma inks agreement with researchers at Karolinska Institute

AVI BioPharma has entered into an agreement with scientists at the Swedish medical university Karolinska Institute for the identification of RNA-based therapeutic candidates for the treatment of Extensively Drug-Resistant Tuberculosis. Under the agreement, both the parties are expected to investigate RNA-based drug candidates using AVI's proprietary, intrinsically charge-neutral, phosphorodiamidate morpholino oligomer based chemistry platform. The intellectual property developed under the collaboration will be jointly owned. AVI will retain rights to the therapeutic candidates employed in the collaboration and will hold an exclusive option to negotiate with the Karolinska Institute to acquire its interest in that intellectual property. AVI's experience targeting bacterial and host factor genes using proprietary PMO-based chemistries with world scientific leaders in the research and treatment of XDR-TB.

India: Abbott board of directors approves proposal to merge the company with Solvay Pharma

India based drug firm Abbot India says that its board of directors had approved a proposal seeking to merge the firm with Solvay Pharma. The proposal is a 2:3 share swap ratio. In a filing to the Bombay Stock Exchange, Abbot reiterated the swap merger would be under 2:3 ratio, and every two share of Solvay Pharma India Ltd will entitle their holder to three shares of Abbott India Ltd. The filing stated that the board of Solvay had also approved the merger of both companies. The draft scheme of amalgamation has been approved under sections 391 to 394 of the Companies Act, 1956, it added. The swap ratio for the merger was recommended by Ernst & Young for Abbott India and Price water house Coopers for Solvay Pharma. UBS Securities provided fairness opinions on the valuation of assets and shares to the board of Solvay Pharma.

India: Merck, Ranbaxy terminate agreement for anti-infective drug discovery, development

Merck & Co. Inc. and Ranbaxy Laboratories Ltd. ended their drug discovery and development agreement for investigational antibacterial and antifungal products, according to The Wall Street Journal and other news agencies. The agreement, initially signed, was set to last for five years and could have been extended thereafter. Under the terms of the agreement, Ranbaxy received an undisclosed up-front payment and could have received more than US\$100m upon the achievement of certain milestones. The Indian drug firm also was eligible to receive significant royalties on worldwide net sales of any resulting products. Neither company has issued an official statement providing further details or reasons for ending the collaboration.

India: Apollo Hospitals Launched Its 50th Hospital at Secunderabad

The hospital offers specialty care in over 30 medical and surgical disciplines. The hospital has spacious patient care rooms and world-class intensive care units with over 50 beds dedicated to cardiac ICU, surgical ICU and medical ICU. The round-the-clock emergency services at the hospital are capable of handling all accident and emergency cases. The hospital services are supported by experienced medical care professionals and sophisticated technology including hi-tech operation theaters, latest flat panel digital cardiac cath lab and full-fledged dialysis unit. Apollo Hospitals, Secunderabad has comprehensive diagnostic facilities including MRI and CT scan apart from ECHO, TMT, Ultrasound, EEG, EMG, PFT, ECG and X-ray. Most of the consultants at the hospital have international experience.

India: GE Healthcare Forms Strategic Alliance with CardioDx

GE Healthcare, the healthcare business of GE and CardioDx, a pioneer in cardiovascular genomic diagnostics, that the companies have entered into a strategic alliance to advance and co-develop diagnostic technologies to improve the care and management of patients with cardiovascular disease. Building on the alliance, the GE Healthymagination fund, a new equity fund that makes investments in highly promising healthcare technology companies, has invested US\$5m in CardioDx as part of a Series D round that the fund is leading. The alliance between the two companies aligns with GE's healthymagination initiative which focuses on reducing cost, increasing access and improving quality in healthcare. This marks the first investment for the Healthymagination fund. Other financial terms were not disclosed.

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India: Roche & IBM Collaborate to Develop Nanopore-Based DNA Sequencing Technology

Roche and IBM have an agreement to develop a nanopore-based sequencer that will directly read and decode human DNA quickly and efficiently. Focused on advancing IBM's recently published 'DNA Transistor' technology, the collaboration will take advantage of IBM's leadership in microelectronics, information technology and computational biology and Roche's expertise in medical diagnostics and genome sequencing. The novel technology, developed by IBM Research, offers true single molecule sequencing by decoding molecules of DNA as they are threaded through a nanometer-sized pore in a silicon chip. The approach holds the promise of significant advantages in cost, throughput, scalability, and speed compared to sequencing technologies currently available or in development.

India: Aditya Birla Money Launched Co-branded Health Card with Indian Health Organization

Aditya Birla Money, the broking, distribution and wealth management arm of Aditya Birla Financial Services Group launched a new co-branded health card with Indian Health Organization Pvt Ltd. The Aditya Birla Money is an IHO Health Plan Card- will bring affordable, preventive and pre-hospitalization healthcare at a cost as little as Rs7 per day for a year for a family of four members, and also comes with a Personal Accident Cover. The Aditya Birla Money- IHO Health Plan Card brings together a consortium of individually practicing medical professionals and facilitates its members to avail concessional rates on quality medical services. These services range from a free dial-a-doctor facility, to subsidised treatments at the finest path labs, dentists and doctors and, are currently being offered in 17 prime cities of the country.

India: Narayana Hrudayalaya and Harvard MIT Join Hands to Launch m-Health Project

Narayana Hrudayalaya and SANA had collaboration on a mobile healthcare project to enable screening and early detection of chronic diseases in India. These institutions will train general physicians, nurses and medical students to screen for high-risk individuals using automated questionnaires encoded on the phone and high quality lesion pictures using the phone's camera. They will diagnose the condition either by using the phone's decision support algorithms, or by uploading the data to NH's EMR system for specialist feedback. They can then recommend treatment and counsel the patient through interactive videos on the phone, or if required refer to specialist.

India: Nova Forms JV with Max to Start Day Care Surgery Centers

Nova Medical Centers, a specialized day care surgery centre chain, and Max Healthcare Institute Limited has a JV to expand the reach of day care surgery in the National Capital Region. MHC will hold a 31% stake in the JV entity. This strategic alliance is designed to help both companies maximise the reach and efficiency of their services. Nova is set to expand its reach across the NCR region with two day care centers scheduled to open in the next few months with plans to reach a total of six centers in the near future. Nova Medical Centers will seamlessly access the pool of clinicians practicing at MHC hospitals. MHC's hospitals in turn would be the preferred referral destination for all major surgeries and advanced diagnostics cases required for the Nova patients, which cannot be performed at the day care centers.

INVESTMENTS**Americas****USA: Cx Partners invests Rs1.88 billion in medical diagnostics firm Thyrocare Technologies Ltd**

Cx Partners reported had invested around Rs1.88 billion in Thyrocare Technologies for the acquisition of a 30% stake. Cx Partners, the private equity firm, will acquire the stake in the medical diagnostics firm, valuing Thyrocare Technologies Ltd at Rs6.27 billion. According to the firm, the funds to be accrued from the sale will go into expansion into radiology diagnostics like CT Scans and magnetic resonance imaging. The transaction is inclusive of a performance-based component, in which doctors may receive some additional shares in case the company exceeds the performance requirements. As part of the deal, Ajay Relan, founder of Cx Partners and Vivek Chhachhi, partner at Cx will become board members of Thyrocare.

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India: Elder Pharma gets Japanese approval for API plant in Maharashtra

The company has received accreditation from the Ministry of Health, Japan for its active pharmaceutical ingredients (API) plant in Patalganga. Elder is positioning itself to be an API and advanced intermediate supplier to Japanese market. This accreditation for the API plant is a step towards strengthening Elder's position as a supplier of APIs and intermediates in the Japanese market. The company has developed two products going off patent in the Japanese market in 2014. One of the products is from CNS category and the second one is from GI segment.

India: FDA approves Lupin Pharma Nabumetone tablets

The US Food and Drug Administration has approved Lupin Pharmaceuticals' Nabumetone tablets, 500mg and 750mg strengths. Nabumetone is in a group of drugs called nonsteroidal anti-inflammatory drugs and it works by reducing hormones that cause inflammation and pain in the body. Nabumetone is used to relieve pain, tenderness, swelling, and stiffness caused by osteoarthritis and rheumatoid arthritis. Lupin claims that Nabumetone is the generic equivalent of GlaxoSmithKline's Relafen tablets indicated for acute and chronic treatment of the signs and symptoms of osteoarthritis and rheumatoid arthritis.

FDA Approvals:**USA: FDA Approves Gardasil for Anal Cancer Prevention**

Gardasil is now approved as a vaccine for preventing anal cancer and associated precancerous lesions due to human papillomavirus types 6, 11, 16, and 18, in males and females from 9 to 26 years old. Human papillomavirus is a sexually transmitted infection that usually causes genital warts, but it can also cause several cancers such as cervical cancer in women and anal cancer in both men and women, and precancerous lesions. Treatment for anal cancer is challenging; the use of Gardasil as a method of prevention is important as it may result in fewer diagnoses and the subsequent surgery, radiation or chemotherapy that individuals need to endure the disease.

Asia-Pacific**India: Sun Pharma gets USFDA nod for generic Boniva**

Ibandronate Sodium Injection is indicated in the treatment of osteoporosis in post menopausal in women, the company stated. The annual sale in of the drug in US is about US\$70m. The company has received the granted approval from United States Food and Drug Administration (USFDA), an agency of the United States Department of Health and Human Services. Sun Pharmaceutical Industries Ltd manufactures and markets a large basket of pharmaceutical formulations as branded generics as well as generics in India, US and several other markets across the world.

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Product Focus – Hepatitis B Vaccine

Introduction

Hepatitis B is an infectious illness caused by hepatitis B virus which infects the liver of hominoida, including humans, and causes an inflammation called hepatitis. Originally known as serum hepatitis, the disease has caused epidemics in parts of Asia and Africa, and it is endemic in China. About a third of the world's population, more than 2 billion people have been infected with the hepatitis B virus. This includes 350 million chronic carriers of the virus. Transmission of hepatitis B virus results from exposure to infectious blood or body fluids. The acute illness causes liver inflammation, vomiting, jaundice and rarely, death. Chronic hepatitis B may eventually cause liver cirrhosis and liver cancer a fatal disease with very poor response to current chemotherapy. The infection is preventable by vaccination.



Hepatitis B virus is a hepadnavirus hepa from hepatotropic and DNA because it is a DNA virus and it has a circular genome composed of partially double-stranded DNA. The viruses replicate through an RNA intermediate form by reverse transcription, and in this respect they are similar to retroviruses. Although replication takes place in the liver, the virus spreads to the blood where virus-specific proteins and their corresponding antibodies are found in infected people. Blood tests for these proteins and antibodies are used to diagnose the infection.

History:

The earliest record of an epidemic caused by hepatitis B virus was made by Lurman in 1885. An outbreak of smallpox occurred in Bremen in 1883 and 1,289 shipyard employees were vaccinated with lymph from other people. After several weeks, and up to eight months later, 191 of the vaccinated workers became ill with jaundice and were diagnosed as suffering from serum hepatitis. Later, numerous similar outbreaks were reported following the introduction, in 1909, of hypodermic needles that were used, and more importantly reused, for administering Salvarsan for the treatment of syphilis. The virus was not discovered until 1965 when Baruch Blumberg, then working at the National Institutes of Health, discovered the Australia antigen in the blood of Australian aboriginal people.

Types of Hepatitis

- **Hepatitis A:** This is caused by eating infected food or water. The food or water is infected with a virus called HAV (Hepatitis A Virus).
- **Hepatitis B:** This is an STD (sexually transmitted disease). It is caused by the virus HBV and is spread by contact with infected blood, semen, and some other body fluids.
- **Hepatitis C:** Hepatitis C is usually spread through direct contact with the blood of a person who has the disease. It is caused by the virus HCV.
- **Hepatitis D:** Only a person who is already infected with Hepatitis B can become infected with Hepatitis D. It is caused by the virus HDV. Infection is through contact with infected blood, unprotected sex, and perforation of the skin with infected needles. The liver of a person with Hepatitis D swells.
- **Hepatitis E:** A person can become infected by drinking water that contains HEV. The liver swells, but there is no long-term consequence. Infection is also possible through anal-oral sex.

Symptoms of Hepatitis B

Acute infection with hepatitis B virus is associated with acute viral hepatitis is an illness that begins with general ill-health, loss of appetite, nausea, vomiting, body aches, mild fever, dark urine, and then progresses to development of jaundice and has been noted that itchy skin has been an indication as a possible symptom of all hepatitis virus types.

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Chronic infection with hepatitis B virus may be either asymptomatic or may be associated with a chronic inflammation of the liver, leading to cirrhosis over a period of several years. This type of infection dramatically increases the incidence of hepatocellular carcinoma. Chronic carriers are encouraged to avoid consuming alcohol as it increases their risk for cirrhosis and liver cancer.

Hepatitis B Vaccination			
Schedule	Infant whose mother is infected with HBV	Infant whose mother is not infected with HBV	Older child, adolescent, or adult
First Dose	Within 12 hours of birth	Birth 2 months of age	Any time
Second Dose	1 -2 months of age	1-4 months of age	1 -2 months after first dose
Third Dose	6 months of age	6-18 months of age	4 - 6 months after first dose

Source: Market Sources; Cygnus Research

What are the sources of infection for Hepatitis-B

- Contact with infected blood and body fluids, like from blood transfusions or to medical personnel during operations and patient care.
- Contaminated I.V. needles including accidental needle pricks.
- Sex with infected person or multiple partners
- From infected mother to newborn.

Risks of hepatitis B vaccine: A vaccine, like any medicine, is capable of causing serious problems, such as severe allergic reactions. The risk of hepatitis B vaccine causing serious harm, or death, is extremely small. Hepatitis B vaccine is much safer than getting hepatitis B disease.

Mild problems

- Soreness where the shot was given, lasting a day or two (up to 1 out of 11 children and adolescents, and about 1 out of 4 adults)
- Mild to moderate fever (up to 1 out of 14 children and adolescents and 1 out of 100 adults)

Severe problems

- Serious allergic reaction (very rare)

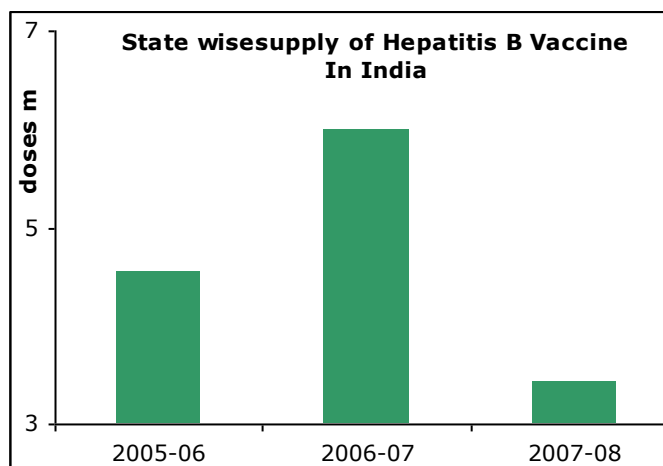
Vaccine market Overview

Vaccine production has gained renewed attention from pharmaceutical companies in recent years. This comes as a result of technological advances, successful early-stage research. Although representing only about 1.5% of all pharmaceutical revenues, the vaccine business is currently growing at a double-digit rate with particular attention directed at influenza, AIDS, and new cancer vaccines. Vaccine profits to remain below the margins of branded pharmaceuticals. Compared with pharmaceutical "blockbusters" capable of annual sales well over one billion dollars, most vaccines continue to yield more modest profits for manufacturers.

The market is expected to explode in future, with the global revenues already exceeding US\$20 billion in 2008. The global vaccine market is expected to top US\$10 billion this year and US\$23.8

Major Players

- Shantha Biotech
- Zydus Cadila
- Panacea
- Serum
- GSK
- Merck
- Sanofi-aventis



Source: India Stat; Cygnus Research

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billion by 2012. The vaccines bring higher margins in the traditional pharmaceutical, thereby encouraging more and more players to enter the market. Vaccines will see a big spike due to increased uptake of influenza and hepatitis vaccines, predicts a report from Kalorama Information. Cancer vaccines will also become a major player in the vaccine market, rising from its current level of US\$135m to more than US\$8 billion by 2012. Adult vaccines will rise from US\$3.7 billion to US\$7.5 billion in 2012. The report projects the combined global adult and pediatric vaccine markets will total US\$15 billion by 2012. Sanofi Pasteur was the second leading vaccines company in 2009 with sales of US\$5.7 billion.

Outlook

Vaccines have emerged as one of the most lucrative segment in the global pharmaceutical industry. Demand for a pediatric vaccine is generally quite predictable; it is directly related to the size of the birth cohort in a given year. Such capacity is typically met without difficulty by manufacturers of licensed vaccines. Meanwhile, the largest single purchasers of vaccines are governments. Increasingly, not-for-profit institutions such as the Bill and Melinda Gates Foundation have been playing a role in funding vaccine research and development. Their relatively recent emergence in vaccine research, coupled with the new strategies developed by dozens of small biotechnology companies, have the potential to transform a field previously dominated by only a handful of pharmaceutical companies in collaboration with academic researchers.

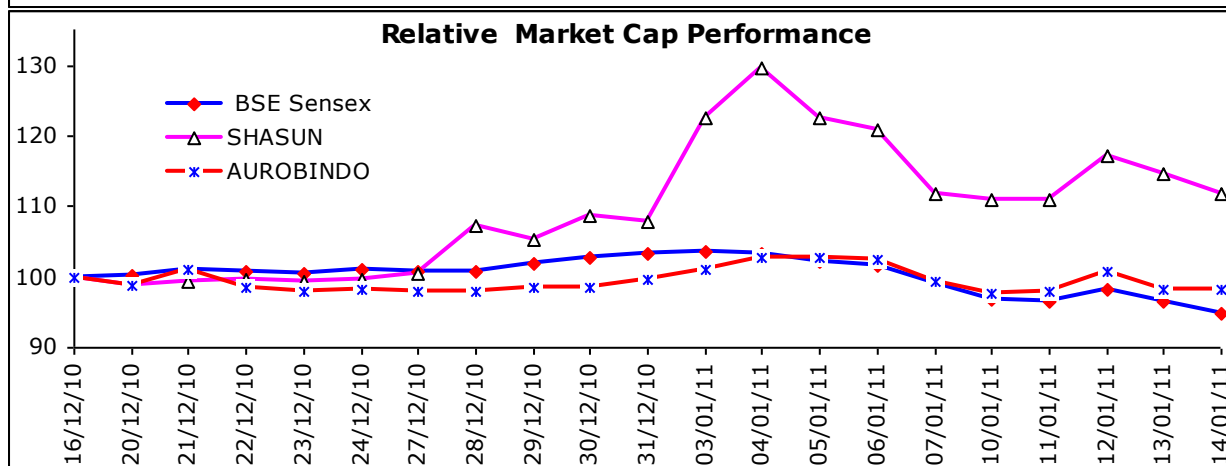
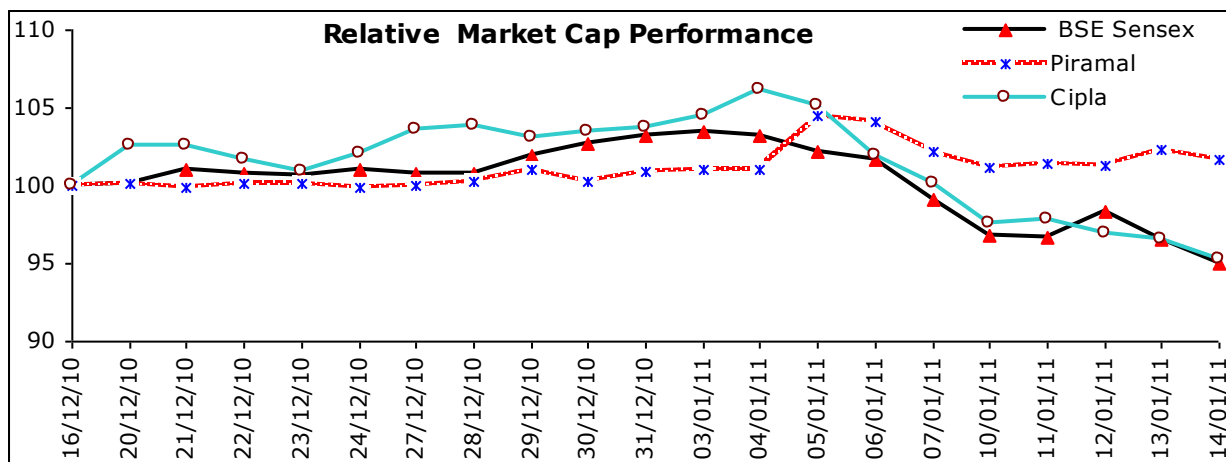
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Stock Scan



Source: BSE India; Cygnus Research

Index	1 st Week (16-24 Dec 2010)			2 nd Week (27th Dec-31st Dec 2010)		
	Opening	Closing	Var(%)	Opening	Closing	Var(%)
BSE (Points)	19,864.85	20,073.66	1.05	20,028.93	20,509.09	2.40
CIPLA (Rs)	356.55	363.80	2.03	369.15	369.90	0.20
PIRAMAL (Rs)	464.80	464.40	-0.09	464.80	468.75	0.85
SHASUN (Rs)	60.00	59.80	-0.33	60.25	64.75	7.47
AUROBINDO (Rs)	1321.60	1299.40	-1.68	1292.40	1317.40	1.93

Index	3 rd Week (03rd - 7th Jan 2011)			4 th Week (10-14 Jan 2011)		
	Opening	Closing	Var(%)	Opening	Closing	Var(%)
BSE (Points)	20,561.05	19,691.81	-4.23	19,224.12	18,860.44	-1.89
CIPLA (Rs)	372.50	356.85	-4.20	347.80	339.55	-2.37
PIRAMAL (Rs)	469.40	474.95	1.18	470.00	472.40	-2.37
SHASUN (Rs)	73.60	67.15	-8.76	66.65	67.15	0.75
AUROBINDO (Rs)	1335.80	1311.55	-1.82	1289.15	1296.55	0.57

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Upcoming Events

1.	Event	Pharma World Expo
	Date	Feb 23-26, 2011
	Venue	Bombay Exhibition Centre(BEC) Mumbai, India
	Highlights	It is one of the foremost shows for pharma and biotech industry. It will prove to be one of the largest exhibition and conference for chemical and pharma industry. Vesting on an area more than 30,000 square meters.
	Contact Details	Chemtech Foundation 26, Maker Chambers VI Nariman Point, Mumbai, India Tel:+(91)-(22)-22874758; Fax:+(91)-(22)-22870502
2.	Event	Asia Healthcare Expo
	Date	Feb 24-26, 2011
	Venue	Bangabandhu International Conference Centre, Dhaka, Bangladesh.
	Highlights	Asia Healthcare Expo will bring together all the key players under one roof, providing exhibitors with a compelling networking opportunity-to precisely target relevant budget-holders in the shortest time possible and at an affordable cost.
	Contact Details	Bangladesh Association Of Pharmaceutical Industries (BAPI) Bangladesh Aushad Shilpa Samity, House # F-31, Bangladesh. Tel:+(880)-(2)-9889731; Fax:+(880)-(2)-8816767
3.	Event	Asia Pharma Expo
	Date	Feb 24-26, 2011
	Venue	Bangabandhu International Conference Centre, Dhaka, Bangladesh
	Highlights	It aims at bringing together world renowned companies as well as newly launched companies on one platform. It is an invitation to all those who want to seize this opportunity and to further galvanizing their position to take share of this lucrative market.
	Contact Details	Bangladesh Association Of Pharmaceutical Industries (BAPI) Bangladesh Aushad Shilpa Samity, House # F-31, Road #, Banani, Bangladesh Tel:+(880)-(2)-9889731; Fax:+(880)-(2)-8816767
4.	Event	Integtative Healthcare Symposium
	Date	Mar 04-06, 2011
	Venue	New York Hilton Hotel New York, United States Of America
	Highlights	It is the only exhibition organized under the auspices of the Ministry of Health and in cooperation with the Physicians Association. With a constantly updated visitor and potential participant database and active PR campaign a large number of specialized visitors are guaranteed.
	Contact Details	Diversified Business Communications, 121, Free Street, P.O. Box 7437, Maine, United States Of America. Tel:+(1)-(207)-8425500; Fax:+(1)-(207)-8425503
5.	Event	KRAKDENT
	Date	Mar 05-07, 2011
	Venue	Targi w Krakowie Exhibition Centre Krakow, Poland
	Highlights	It is the premier exhibition in Poland for Dental and Pharmaceutical industry. This is the 19th edition of the event. The will provide the opportunity to meet all the Dental and Pharmaceutical industry's professional under one roof. This is the only platform where exhibitor and visitor can meet and exchange their ideas.
	Contact Details	Targi w Krakowie Ltd., 31-586, Centralna 41-A Street, Krakow, Poland Tel: +(48)-(12)-6445932; Fax: +(48)-(12)-6446141

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6.	Event	Pharma Asia
	Date	Mar 12-14, 2011
	Venue	Karachi Expo Center, Karachi, Pakistan.
	Highlights	Pharma Asia is being organized at the most opportune time when the Government is looking forward to expand the developing industries of the Country, which have shown tremendous growth in the past few years. The Exhibition would serve as a comprehensive showcase of the latest in technology, equipment and machinery as well as allied services, while providing investors with a definite outlook of the regional Pharmaceutical industry.
	Contact Details	E- Commerce Gateway Pakistan Private Limited, C-17, KDA Scheme - I Off, Pakistan. Tel: +(92)-(21)-111222444; Fax: +(92)-(21)-34536330
7.	Event	Health Industry Show
	Date	Mar 16-18, 2011
	Venue	Tokyo International Exhibition Center (Tokyo Big Sight) Tokyo, Japan
	Highlights	It is by far the largest and most important exhibition and conference serving this rapidly growing market and attracts a huge audience of buyers and health industry professionals.
	Contact Details	CMP Japan Company Limited, Kanda 91 Building, 1-8-3, Kaji-Cho, Chiyoda-Ku, Tokyo, Japan; Tel:+(81)-(3)-52961020; Fax:+(81)-(3)-52961010
8.	Event	Korea International Medical & Hospital Equipment Show
	Date	Mar 17-20, 2010
	Venue	COEX Korea Exhibition Center Seoul, Korea
	Highlights	It is the crucial platform for the Korea medical industry and public health service. It is the only show in Korea where you will see a complete range of new and innovative products and services in medical technology and IT equipment, diagnostics, rehabilitation, nursing and consumer medicine.
	Contact Details	Korea E & Ex, Inc., Room 2002, WTC 159-1 Samsung-Dong, Kangnam-Ku, Korea; Tel:+(82)-(2)-5510102; Fax:+(82)-(2)-5510103
9.	Event	Pharmaceutical & Technologies Exhibition
	Date	Mar 22-24, 2011
	Venue	Dubai International Convention & Exhibition Centre Dubai, United Arab Emirates
	Highlights	It is recognized as an eminent pharmaceutical event which is held every year. The DUPHAT is 16th edition which provides an insight into the pharma world. It proves to be highly vital in emerging out as an ideal meeting point for various pharmacists, physicians, medical representatives and others.
	Contact Details	INDEX Conferences & Exhibitions Organisation Est. (A Member of INDEX Holding), Dubai Health Care City, Block B Office 203, 2nd Floor, Dubai, United Arab Emirates; Tel:+(971)-(4)-3624717; Fax:+(971)-(4)-3624718
10.	Event	Medical Fair India
	Date	Mar 25-27, 2011
	Venue	Pragati Maidan New Delhi, Delhi, India
	Highlights	For tapping emerging opportunities of medical sector. It is an international exhibition which acts as an ideal podium for displaying radiology & imaging equipment, physiotherapy equipment, Critical care/Emergency Equipment, Disinfection & Waste Management Systems and others. The event is arranged along with conferences, seminars for showcasing the various aspects of pharma world and is attended by medical professionals of all over world.
	Contact Details	Messe Duesseldorf India Pvt. Ltd., 1, Commercial Complex, 2nd Floor, Pocket H & J, Sarita Vihar, New Delhi - 110 076, India. Tel: +(91)-(11)-26971056; Fax: +(91)-(11)-26971746

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Cygnus Business Consulting & Research Pvt. Ltd
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Tel: +91-40-23430203-07, Fax: +91-40-23430201,
Email: info@cygnusindia.com; Website: www.cygnusindia.com

11.	Event	Bio Pharma Asia Convention
	Date	Mar 28-31, 2011
	Venue	Marina Bay Sands, Singapore
	Highlights	It is uniquely positioned as Asia's only exhibition that showcases leading technocrats, solution and service suppliers across the entire value chain of the bio Pharma industry in Asia.
	Contact Details	Terrapinn Pte Limited, Wren House, 43 Hatton Garden, London, United Kingdom; Tel: +(44)-(20)-70921000; Fax: +(44)-(20)-72421548
12.	Event	Biologic Manufacturing World Asia
	Date	Mar 29-30, 2011
	Venue	Marina Bay Sands, Singapore
	Highlights	The conference aims at bringing together the global and Asian professionals of biopharma industry, so that they can share their experiences related to biologic manufacturing technology applications and outsourcing strategies. Be a part of this 4th Annual biologic manufacturing world Asia 2011 and learn to implement effective bioprocess strategies. It will focus on topics like best upstream & downstream processing to gain operational excellence, manufacturing advancements of biosimilar and vaccine production, future of biologic manufacturing facility designs etc. Be a part of this biopharma conference and get to know about the latest trends in pharma sector.
	Contact Details	Terrapinn Pte Limited, Wren House, 43 Hatton Garden, London, United Kingdom; Tel: +(44)-(20)-70921000; Fax: +(44)-(20)-72421548
13.	Event	Logi Pharma
	Date	Mar 29-31, 2011
	Venue	President Wilson Hotel Geneva, United States Of America
	Highlights	it is the annual gathering of senior-level pharmaceutical supply chain executives in Geneva, where over 120 Global Heads and VPs of supply chain, logistics and procurement gather to share best practice and identify solutions to the most prevalent challenges affecting pharmaceutical logistics.
	Contact Details	Worldwide Business Research, 535, Fifth Avenue, 8th, New York, United States Of America; Tel: +(1)-(888)-4826012; Fax: +(1)-(212)-8852798
14.	Event	SouthEast Asian Healthcare & Pharma Show
	Date	Mar 29-31, 2011
	Venue	Kuala Lumpur Convention Centre (KLCC) Kuala Lumpur, Malaysia
	Highlights	It is a landmark event which is characterized as South East Asia's only dedicated event. The B2B event is said to connect various professionals from international medical fraternity. Various distributors, importers and others glance over latest dental equipment, surgical products, and wellness equipment among others and enter into trading deals.
	Contact Details	ABC Exhibitions, No.8, 16/6C, 46350, Petaling Jaya, Malaysia. Tel: +(60)-(3)-79546588; Fax: +(60)-(3)-79542352
15.	Event	Healthcare Ireland
	Date	Apr 05-06, 2011
	Venue	Royal Dublin Society Main Hall Complex Dublin, Ireland
	Highlights	It is designed to fill that gap by creating an environment for the presentation of advances in healthcare achieved through the application of science, technology and best practice in products, equipment, works and services. This is achieved by means of a series of conference presentations by key practitioners and suppliers and a major exhibition.
	Contact Details	Step Exhibitions Limited, Step House, North Farm, Tunbridge Wells, United Kingdom. Tel: +(44)-(1892)-518877; Fax: +(44)-(1892)-518811

16.	Event	SouthEast Asian Healthcare & Pharma Show
	Date	Apr 06-08, 2011
	Venue	Kuala Lumpur Convention Centre, Kuala Lumpur, Malaysia.
	Highlights	It is a landmark event which is characterized as South East Asia's only dedicated event. The B2B event is said to connect various professionals from international medical fraternity. Various distributors, importers and others glance over latest dental equipment, surgical products, wellness equipment and others enter into trading deals.
	Contact Details	ABC Exhibitions, No.8, 16/6C, 46350, Petaling Jaya, Malaysia. Tel: +(60)-(3)-79546588; Fax: +(60)-(3)-79542352
17.	Event	P-Mec
	Date	Apr 18-20, 2011
	Venue	Tokyo International Exhibition Center (Tokyo Big Sight) Tokyo, Japan
	Highlights	It is the abbreviation of Pharmaceutical Machinery & Equipment Convention, which is the exhibition of machine and equipment for pharmaceutical studies development and manufacturing.
	Contact Details	CMP InformationIndustrieweg 54, P.O. Box 200, 3600 AE, Maarsen, The Netherlands. Tel:+(31)-(346)-559444; Fax:+(31)-(346)-573811
18.	Event	Bangalore Bio
	Date	May 04-06, 2011
	Venue	TBA Bengaluru, India
	Highlights	It will offer an unrivalled opportunity in Asia Pacific region to meet with the who's who of the Biotech world in one place at one time, nearly over 600 delegates, 72 speakers, 150 exhibitors participated in this event.
	Contact Details	M. M. Activ, Bangalore, UNI Building, Thimmaiah Road, Millers Tank Bund, Bengaluru, India. Tel: +(91)-(80)-41131912; Fax: +(91)-(80)-41131914
19.	Event	Meditec Clinika
	Date	Jul 02-04, 2011
	Venue	Palace Grounds Bengaluru, Karnataka, India
	Highlights	Its presents an opportunity in South Asia as the largest platform for the Medical Equipment and technology industry. It is to act as a catalyst to bring together a varied genre of medical professionals under one roof to interact, promote and transact business in this industry which will eventually lead to better healthcare for the common man in this densely populated region. We invite all visionary companies and individuals to constructively contribute to becoming a part of this congregation and profit from interaction at this platform for a common goal to equally distribute medical technology in all regions of the world.
	Contact Details	Orbitz Exhibitions Private Limited, 202, Navyug Industrial Estate, T. J. Road, Sewree, Mumbai - 400 014., India. Tel: +(91)-(22)-24102801; Fax: +(91)-(22)-24102805
20.	Event	Healthex
	Date	Aug 05-07, 2011
	Venue	Bangalore International Exhibition Centre (BIEC) Bengaluru, India
	Highlights	It is an International exhibition focusing on Hospital, Medical and Surgical Equipment, Materials, Supplies and Allied services. The show presents a complete range of equipment, materials, services, processes, systems, components, consumables which find wide use in medical surgeries, hospitals, clinics, and diagnostic centres from across the world.
	Contact Details	Confederation of Indian Industry, Plot No. 249-F, Sector-18, Udyog Vihar, Phase-IV, Gurgaon, India. Tel:+(91)-(124)-4014060; Fax:+(91)-(124)-4014088

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21.	Event	Pharmac India
	Date	Sep 17-19, 2011
	Venue	Gujarat University Exhibition Hall Ahmedabad, India
	Highlights	It is recognized as a focused exhibition for Pharma and Health care industry. It is 3 days exhibition which is aiming towards highlighting varied related medical products. It will prove to be a large hub of reputed professionals from pharmaceutical formulation, herbal products, veterinary drug, medical and disposal, pharmaceutical machinery and many other sectors.
	Contact Details	Orbitz Exhibitions Private Limited, 202, Navyug Industrial Estate, T. J. Road, Sewree, Mumbai, India. Tel:+(91)-(22)-24102801; Fax:+(91)-(22)-24102805
22.	Event	Hospital Infrastructure India
	Date	Oct 21-23, 2011
	Venue	Bombay Exhibition Centre(BEC) Mumbai, India
	Highlights	It is an India's premier international exhibition on hospital infrastructure, planning, supplies and health care development sector. This exhibition will be the sole platform where Investors, Planners, Builders, Contractors, Architects and Designers will meet senior managers and commissioners of healthcare facilities in India.
	Contact Details	IIR Exhibition India, 751, 5th Floor, Bldg 7, Solitaire Corporate Park, Andheri East, Mumbai, India; Tel:+(91)-(22)-40203329

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