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Biotech gets personal

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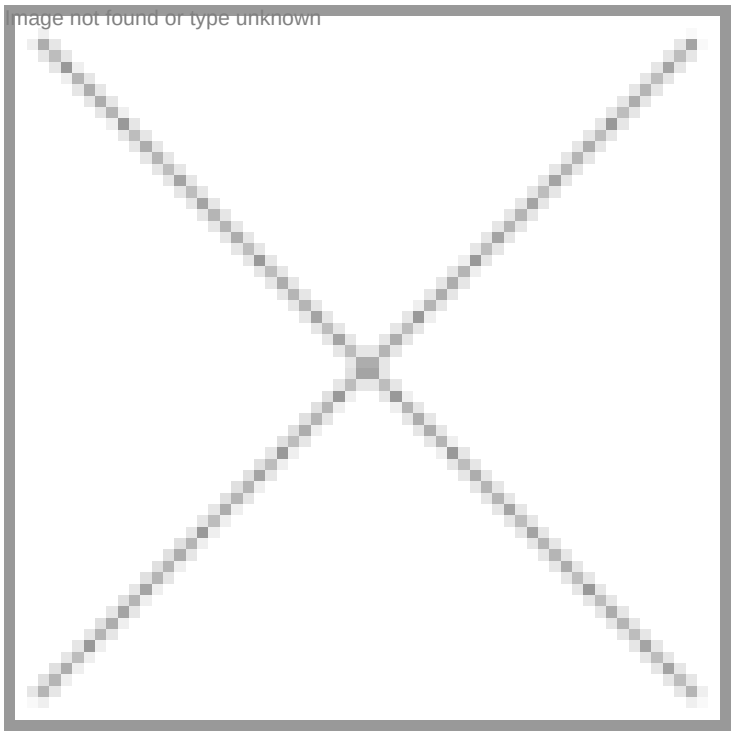

Biotech gets personal

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Kiran Mazumdar-Shaw, CMD, Biocon Ltd

In 1999, a young boy was brought to the famed Mayo Clinic in Rochester, Minnesota in an advanced stage of leukemia with the prognosis that he was not responding to standard medication which belonged to a family of drugs based on theopurines. What doctors at the Mayo Clinic discovered was that the boy had a missing gene that did not allow him to metabolise theopurine which resulted in a build-up of this chemical to toxic levels. The poisoned boy was immediately switched over to other forms of medication and he was saved. Common drugs like Vantolin for asthma, Codeine for pain, Prozac for depression, are also known to have detrimental effects on patients with misspelled or missing genes. This has lead to a revolutionary new form of customized gene based medication which will in the near future become a medical norm.

The scientific understanding of diseases is reaching depths at molecular and genetic levels which is now making it possible to treat patients in a personalized manner. It will not be long before each individual will carry an all encompassing medical report on a chip that will enable doctors to prescribe customized dosages of gene specific medication!

Stem cell research is also opening new vistas in regenerative medicine where the day is not too far when a kidney or a heart

could be grown up in a laboratory from an individual's stem cells which would ensure absolute homogeneity and prevent any scope of rejection.

Biotechnology also has the ability to harness plants to generate vaccines and antibodies to fight infection. Genetic manipulation of plants is even being pursued to produce biodegradable materials that can replace plastics. Nutritional genes can be inserted to food crops to produce vitaminized and protein-rich foods.

On the environmental side, bioremediation is now an important strategy for dealing with toxic contamination. The unique power of microbes to metabolize toxins is perhaps the most effective means to deal with environmental pollution. Enzyme technologies likewise are rapidly replacing chemical processes, paving the way for cleaner and eco-friendly production technologies. For example, acid hydrolysis of starch to produce a range of products spanning glucose to dextrins is now an obsolete process and has been replaced by an enzymatic process which has not only eliminated the high COD and BOD levels generated by the acid process but also has resulted in high conversion efficiencies with greater degrees on control. Apart from this, enzyme processes have also done away with extreme process parameters of temperature and pressure resulting in large energy savings.

Whilst biotechnology provides an enormous benefit to mankind, the sensitivities associated with this new technology have also to be addressed. Regulatory systems to ensure human and environmental safety are paramount in this respect. Dissemination of information to allay apprehensions associated with biotechnology is also important. The "fear of the unknown" has evoked hostile criticism and damaging allegations against this emerging technology and it is imperative that we do not stifle progress on the grounds of ignorance.