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Opportunities in Genetic Testing

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-S D, *Acton Biologicals*

In the next five years, we will be talking in terms of our genes, like we talk in terms of our mobile phones today. In 2015, conversations like “I have 5MP camera and palm operating system on my mobile” will change as “I have a gene to be an athlete and a gene for baldness”. This is going to be a big opportunity for people in healthcare, pharmaceutical, research, diagnostics and it also poses great challenge to people regulatory affairs, insurance and the mass population. Owing to the crashing genome analysis prices, by 2015, it might be possible to do the whole genome analysis of an in

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1990 – Human genome project initiated
1996 – Dolly, the sheep was born
1998 – Microarray chip
2003 – First human genome sequence revealed

2008 - $1,000 genome

Markets

Right now, the market focuses on animal genetics, plant genetics, pathogen genetics and basic research, but in the longterm human genetics will gain prominence. Even though the human genome project was completed in 2003, we still do not know the exact number of genes we have. Some say it is 19,000 while others still consider it as 30,000. We all differ from each other because of the variation in single-nucleotide polymorphisms (SNPs), copies number variations, gene expression, and epigenetics.

Current status

For the past two decades, huge investments are made in research and we have lots of useful data today. We can screen your DNA and tell, with good amount of accuracy, where your ancestors came from, the best career for you, the kind of food you should be eating, and the types of diseases you might suffer from and how can these be prevented or postponed. We have not yet reached a stage where we can modify the defective genes or have designer baby to have all the good genes? Sure, we are still far far away from that day, but the snow ball has started rolling. There are large genetics testing infrastructures available in all major cities in India.

Global research centers are studying the unknown aspects of the human genome and doing population genetics. Large IT infrastructure is being used for bioinformatics. And clearly the focus is on human genetics. Thousands of individuals are being sequenced for thousands of genes in multiple countries. A lot is already known and hence, doctors are requesting for more and more genetic tests for their patients. Healthy individuals are reading about this subject and are sitting on the fence. The day a company offers a reasonable sequencing service, they are going to get themselves tested and flaunt their genes.

So far, the major users of this information are equipment manufacturers, research centers, pharmaceutical companies, diagnostics centers, very small number of service provides and a small number of end users. The global industry of human genetics services is estimated to be worth $20 billion and the Indian industry will be Rs 50 crore.

But over the years this is going to change drastically. There will be more and more service providers, offering a wide variety of services, to a large number of human beings. Each person will come with a different budget, different information need, and different application. Rich families will like to know everything about them, companies will like to know about their new employees, parents will like to know about their new born kids, insurance companies will like to know about their clients, and doctors will like to know about his patients.

Organizations to watch out for in 2009

Service providers

The companies like 23andMe, DeCode Genetics and Navigenics have been the leaders offering genetic services at $1,000. These companies have built huge infrastructure with cutting edge equipment, huge population databases, bioinformatics suits and marketing muscle to offer their services to the global populations. Their offerings are overwhelming from the technology side, but they might fail to excite a rich person in India. Logistics and commerce are the other hurdles that these companies will need to work on especially in India.

Diagnostics companies

Taking a sample, analyzing it and giving a report are the strong foot hold for diagnostics companies. Large diagnostics laboratories like LabCorp, Mayo Clinic and Myriad Genetics are investing heavily, but have failed to be as aggressive as the genetics focused startups. But these companies that missed the bus are fast catching up, and encashing on their logistics network, experience and relationships with masses.

Equipment companies

Applied Biosystems, Illumina, Affymatrix, Sequenom and a couple of other companies are the most aggressive players pushing technology to the edge. They have been dropping the price and speeding up reports. Just to give you an example, the first human to get sequenced, was done at a price of $3 billion. The second person was sequenced at a price of $500 million in two years, and the third at a price of $100 million in less one year, the next target is to sequence a person in one month for $10,000. Broadly these equipment companies offer competing products, buy their application differ greatly. Illumina uses a bead-based platform, while Applied Biosystems and Affymatrix use the microarray platform. Sequenom uses mass spectrophotometry (MS) based technology. Though the exact number of machines installed by each of these companies in India is not known, India has the best of these machines from all these companies.