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Editorial

Web 2.0 and Genomic Medicine : Are you listening ?

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Two major technological advancements have been making their headway into the way we see practice medicine.. The genome sequence which made us have great insights into the blueprint of life and patho-physiology of diseases and the Internet which has become a ubiquitous entity with extensive ramifications on our everyday activities. Both these technological revolutions have the potential to eventually change the way we understand and practice medicine, with far-reaching changes and a lot more challenges to address , not only on the ethical side, but on the political and economic fronts.

The Human Genome Project, was started in 1990s with a modest aim to map the entire genomic sequence and the coding genes with an aim to understand and map disease genes. The genome project was successfully completed in 2004. The HapMap project aimed at mapping the variations between different world populations was initiated which contributed to the vast resource on human variations as a baseline to understand population variation. The Indian Genome Variation project was also initiated in the same time with the aim of mapping the genetic landscape of our large and diverse population. Both these enormous datasets have contributed to a large pool of genomic resources available for scientists to have a basic understanding of how variations vary between populations and how they can contribute to diseases.

The genome has thrown open a few surprises too. The major one being the complexity of the information the genome encodes for. The major surprise comes form the unraveling of the hitherto unknown regulatory layer offered by non-coding RNAs. The repertoire on non-coding RNAs have been enormously under-estimated and recent high-throughput genomic expeditions mapping the transcriptome of the cell using microarray technology has shown that the human genome transcribes pervasively, the output of the majority of these non-coding RNAs being unknown and thus a major challengge in the post-genomic science.

Another major surprise has been the unraveling of the structural variation of the human genome, offered by technologies enabling us to scan the genome for genome-structural variations or copy number variations, as aptly called. The larger structural variations have been previously associated with various congenital anomalies.

The understanding of genome=variations as a marker for disease predisposition or a major part of the patho-physiology of disease has been a widely looked at topic in recent times. Array based technologies have enabled us to as questions pertaining to disease associations on

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a genome-wide scale. These genome-wide studies for complex disease associated markers have thrown open novel candidates for diseases and also have led to an explosion in the understanding of the patho-physiology of diseases. In the future, a large number of these studies will be performed letting us have better and accurate mapping of disease loci with far reaching changes in the diagnosis and therapy of diseases.

With the advent of cheaper and high throughput sequencing technology otherwise termed as "next generation sequencing", we hope to get more than a thousand human genomes sequenced by the end of the decade. This is sure to be an avalanche of information, and of course, will throw open new avenues for the understanding of human biology.

The Web has been silently transforming in the last few decades from a source of information to a collaborative platform . Newer technological innovations like online communities like Facebook and Orkut along with better communication tools including chat and forums to 3D Virtual worlds like SecondLife has been sweeping through the landscape of the Internet, offering to enable internet be used as a communication and collaboration platform rather than just a source of static information, heralding the so-called Web. 2.0.

Adopting these technological innovations in best-use is needed to catapult to have a better and meaningful health care system. This needs adequate exposure and training of the Medical students no only in emerging sciences but also on how to adopt them and use them in the daily practice. Moreover this throws open extensive research opportunities with potential to make health care better and affordable to the masses, especially in developing countries.

It is a pity that our medical informations system is still static and information centric with little room for asking out-of the box questions or exploration. The world is fast changing with adoption of technology for cutting edge research and practice. Without a changed Medical education system where undergraduate students are exposed to cutting edge technology in genomics and WWW, this would not be possible. There needs to be a revival of the 0edical education curriculum with emphasis on adoption of newer technology for better health care rather than rely on age-old practices for diagnosis and treatment. We should also be able to use advances in technology to move towards a predictive and preventive model for health care rather than a diagnosis and treatment model practiced today. This would translate to huge health care benefits both in the quality of health care and also the economics.

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