

## Filling up India's "Biology Hole"?

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Jason Pontin, the editor of Technology Review points out that "science fiction is to technology as romance novels are to marriage: a form of propaganda". They juxtapose the transcendental with the mundane. We need an occasional dose of transcendence to be extra creative (romantic!) to get those heroic advances in technology. Biotechnology received a fair dose of science fiction transcendence towards the end of the last millennium when the sequencing of the genomes of organisms including human became a reality. President Clinton announced it was probable that our children's children will only know Cancer as a constellation of stars.

The danger in taking science fiction too seriously is that you might just turn into a troll. At the turn of the century, the investment community and the gullible public jumped out of the proverbial frying pan and into the fire. This was graphically visible as the internet bubble bursting and the genomics/biotechnology bubble bloating. Finally, the Wall Street Journal declared in 2004 that biotechnology investments, "the new bubble", had led to \$ 40 billion of losses.

**Genomics: A Comeback Kid:** Freeman Dyson, in his "The Sun, The Genome, the Internet: Tools of scientific revolutions", says that "today the most successful craft industries are concerned with software and biotechnology" and exhorts biologists to build better instruments and tools.

**Vijay Chandru**  
Chairman, Strand Genomics

The genomics tools and techniques that have emerged from the intense efforts over the last decade: sequencers, microarrays, microfluidics, RNAi, mass spectrometry, high throughput and high content screening platforms along with powerful bioinformatics support technologies have begun to mature and deliver high quality measurements.

Gene-expression profiling is already being used in clinical trials to define the population of patients with breast cancer who should receive chemotherapy. Genomic Health, founded by Incyte's Randall Scott, is an exciting company leveraging this

technology. Genomics once again has business models and is making a comeback from the academic research labs into industry. President Clinton's transcendental prediction that our children's children may only know Cancer as a Zodiac sign is still a long way from being realized but biotechnology seems to have the tenacity and renewed vigor to make science fiction a reality.

***Postscript: Are we ready?***

These days India is an exciting destination for global pharma. Every other day, there is a visiting "Head of Global Partnering" from one giant or the other making statements in one of our papers. At a recent private conversation, I was informed that the general view is that while India is a great place for chemistry, manufacturing and more recently for clinical trials, they are perplexed by what they perceive as a "Biology Hole". The perception is that biologists in India have simply not been trained on the use of these new instruments of biology. It is a bit like asking where our IT industry would be if our software engineers and computer scientists are trained on PC XT's.