Genome and us

After the grand achievement on sequencing of the human genome, published simultaneously in *Nature* and *Science*, there is great enthusiasm in the Indian press, and rightly so, to put this discovery in the proper perspective. Our children should know about the agony and ecstasy of scientists who worked towards this goal and about the amount of hard work and technological marvels that usually accompany such mammoth output.

However, a few Indian biologists are continuously claiming in the popular press that Indian scientists could have achieved this mark, had they been encouraged and sufficient money been provided. They also claim that there was scientific mafia to stop an Indian initiative, etc. It is best to ignore such claims, as they always die a natural death (like herbal petrol).

My only reason for writing this letter is that a prominent biologist (not retired, having some power and thus potentially more harmful) has claimed recently, that had he been given ample funds a few years ago, we would have produced the human genome sequence, *albeit* partially. The minds of young students are impressionable and thus, I would like to assure them through this letter that it is not so.

Fifteen years ago, the human genome project was still a dream and thought to be a stupendous task, unprecedented in biology. Funding for this project began in 1987 and was carried out step by step, like any good scientific project. The strategy was modified, a company was formed and public investment was assured. There were 20 groups from 6 countries in the human genome consortium and more importantly, along the path, total sequencing was carried out for close to 200 organelles, 32 eubacteria, seven archea, one fungus, two animals and one plant. Unfortunately, in none of these projects mentioned above, was there any Indian group taking active part. If we were not guided by the glamour of the human genome, and content with talking in the popular press perhaps, we would have focused our attention on a much simpler sequencing programme (like Brazil did) and yet made our mark. However, India is now one of the countries involved in the rice genome project, which is expected to be completed by the end of this year and hopefully, our efforts will not go unnoticed. It is a ten-country consortium completing the reading of 430 million bases of DNA that make the rice genome. Originally it was targeted for 2004, but last month a private company announced the completion of the project with limited access, pushing the inter-country consortium to a greater effort.

Otherwise, in this whole business of genome sequencing, we have never participated seriously or carried out any worthwhile study which can be cited as a reference in the list of 1000 or more titles listed at the end of all the papers taken together published to date.

Certainly, I do not know of any Indian biologist today who, given the whole sequence of the human genome, sufficient money and a year's time, can even write the papers which Venter, Collins and their colleagues have written in the pages of *Science* and *Nature*, respectively, let alone doing the experiments.

Why are these outlandish claims being made? The reason, at least in my mind is pretty simple. In 1953, no Indian scientist had claimed that if he had access to a good lab, he would have produced the double-helix! Because, scientists then did not suffer from the absolute insecurity of having lots of money, yet producing so little. We now get crores for the asking, public money, and we lose sleep at night, as worthwhile results are few and far between. Such insecurity, students of science should know, is the birthplace for tall claims and at times data falsification.

Some of my friends tell me that there is a proverb in this part of the country which says, 'If my aunt had a moustache, she would have been my uncle'. I find lots of similarity with the present-day situation.

However, we must look at things a little more positively and try to think of what we can do in the near and not so near future, in the background of the genome sequence. Let us face the fact that our best trained students are still opting for engineering and medicine and pure science, in particular biology, is still a leftover option. That is perhaps one of the reasons for our success in IT. Anything we plan on genomics needs to involve these engineers and doctors, which is not a difficult task. Indian biologists have some credentials in handling, purifying and expressing proteins. A global human proteome organization (HUPO) has already been launched and now its mission will be to increase awareness of large-scale protein analysis in 'scientific, political and financial circles'. I think, we will be able to make a mark on this initiative at the international level.

Lastly, our funding still should be at the low level, individual-based and oriented towards consumables or recurring expenses. Very little can be achieved by buying fancy equipments for genome/proteome analysis, which are out-dated by the time they are installed. I am sure, in the next five years, there will be private enterprises in big cities who will carry out routine analysis for a payment like in the West and we can survive very well only on good ideas!

No matter how many press statements are given, there is no alternative for a good idea. On the flip side, a distinguished biologist of the country had told me recently that if we buy lots of equipments on a bad project, they will be there at the end of the project. However, if we adopt the model I propose above, at the end of the project, good money is gone on a bad idea!

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