In this issue

Hypothesis vs experiment; *when both contest, who is mightier?*

Central dogma in molecular biology, replication, transcription and translation has come a long way and established itself in such a fashion that none challenges its validity other than modifying the dogma with corollary like reverse transcription. Different enzymes have been discovered, that play key role in each step of the central dogma, and in the last ten years or so their structures have been elucidated, giving us insight on the mode of function at the molecular detail.

In this issue (**page 1029**) R. Gopalakrishna has put forward a hypothesis where he predicts the existence of RNA-dependent RNA polymerase in eukaryotic cells, thus modifying the central dogma a little further. RNA is synthesized in all cells from the DNA template with the help of an enzyme called DNA-dependent RNA polymerase where the sequence of DNA in a given gene is accurately transcribed in a template-dependent fashion, giving rise to a copy of the intermediate RNA which then acts as a template for protein synthesis. On the other hand, DNA multiplies in a semi-conservative path with the help of DNA-dependent DNA polymerase. In retroviruses DNA can also be synthesized from RNA through RNA-dependent DNA polymerase, and the process is called reverse transcription. The question asked in this hypothesis is, can RNA be replicated also with an independent enzyme system? Obviously, that enzyme should be termed as RNA-dependent RNA polymerase and so far has been observed only in some plant viruses. The author puts forward very interesting arguments and hypothesizes that this enzyme should be naturally available in eukaryotes. He predicts four functions for this enzyme: (a) Synthesis of a complementary RNA strand which would act as a surrogate gene. (b) As a buffering agent where mutation can occur, resulting in changes of protein sequence. If such changes are tolerated then they can be incorporated into nuclei through reverse transcription. (c) RNA-dependent RNA polymerase can also be used for RNA editing. (d) The use of complementary RNA as an antisense molecule which finds wide application in biology today including therapeutic use.

However, the author is excited, and rightly so, as his prediction comes true with the cloning of a gene from tomato which codes for RNA-dependent RNA polymerase and its homologs can be found in *Arabidopsis*, tobacco and wheat. Authors who experimentally demonstrated the existence of such a gene predicted its involvement in post-transcriptional gene silencing, possibly mediated through antisense RNA.

Interestingly enough, this was written in 1995 and obviously did not appear in print till now.

Thus, although the prediction was made four years ahead of the actual experimental demonstration, it had to wait to see the light of the day till the experiments were published last year. No doubt, a well-deserved claim historically can be misplaced or denied.

With an assumption that the hypothesis on RNA-dependent RNA polymerase in eukaryotes had to wait 4 years to get published is due to a negative review process in some journal, I am afraid, I understand the dilemma behind such negation.

Central dogma today, is well read, well understood and well defined. Thus modifications, corollaries of this concept are not very rare to come by and we have seen very many propositions on something like reverse translations which do not exist till date. Predictive value in biology is very high as a set of rules governing one phenomenon can be predicted to be true for others. Thus, I know of scientists who predicted twenty years ago the existence of restriction ribonucleases taking a clue from DNA-sequence specific restriction enzymes, but so far none has been demonstrated experimentally. Unless a new paradigm is visualized like operon concept, such predictions are interesting but have little value.

Fortunately, biology till today stands solidly over clear-cut, well executed experiments. If one had predicted the existence of RNA as a catalyst several years before the experimental demonstration of ribozyme of RNaseP, one wonders what would have been the value of such prediction in the history of science!

Nonetheless, such hypotheses as the current one are always very interesting to read.

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Indian satellites

A special section on launch of and payloads carried by INSAT-2E, the latest of the Indian satellites in the INSAT series was published recently in *Current Science* (1999, **76**, 1431–1450). While introducing this section it was noted that PSLV-C2, India's Polar Satellite Launch Vehicle had just then put three satellites, in a single launch, in polar sun-synchronous orbits and some rather brief information about the three satellites had been provided. In this issue two articles: (a) 'IRS-P4 mission' by R. N. Tyagi (**page 1033**) and (b) 'PSLV-C2 mission' by S. Ramakrishnan *et al.* (**page 1038**) provide details of the launch vehicle PSLV-C2 and the Remote Sensing Satellite IRS-P4.

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