

the parasites can tolerate very large protein changes. Total knock-outs of important candidate vaccine antigens such as RAPI and Pbs25, showed no effect on the growth of the parasite. Replacement of candidate vaccine domains from one species to another, e.g. TRAP and MSP1<sub>19</sub>, also did not have any apparent effect on the parasite survival. Antigenically the rodent and the human malarial parasites are quite different from one another. It has been documented that cross-protection on immunization with vaccine candidate antigens is not very effective even on heterologous strains of a particular species<sup>11,12</sup>. The parasite tolerance to large divergence of certain candidate vaccine antigens and to the total lack of some has serious implications on the design of a malaria vaccine. The parasite seems to operate with multiple pathways, and therefore immune responses to some of these components may not be effective. Also the acceptance of antigenically diverse proteins of one species into another indicates the possibility of extensive antigenic diversity

arising in response to selection pressures caused by an effective vaccine.

So far, protozoan parasites have evaded the efforts towards a successful vaccine. The challenge is to understand the mechanisms employed by the parasites to get around the host and vector immune systems. Genetic manipulation of *Plasmodium* is a powerful tool, which will eventually help in uncovering and understanding the functions of proteins and pathways that are crucial in the host-parasite interaction.

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## Swarnajayanti Fellowships for 1998–99 announced

In one of his first statements in the Thirteenth Lok Sabha, Minister for S&T, Murli Manohar Joshi announced on 26 October 1999 the names of the six young scientists awarded the Swarnajayanti Fellowships for 1998–99. They are: Debajyoti Choudhury and D. Prasad of the Mehta Research Institute of Mathematics and

Mathematical Physics, Allahabad; V. V. Ranade of the National Chemical Laboratory, Pune; and N. Kumar Sivarajan, S. Umopathy, and R. Varadarajan of the Indian Institute of Science, Bangalore.

While announcing the names Joshi added: 'I wish to congratulate all these young scientists for receiving the Swarna-

jayanti Fellowships and would like the House to join me in supporting this initiative for the Swarnajayanti Fellowships for the Young Scientists in the years to come so that many more young scientists could join the programme and contribute towards making Indian science internationally competitive.'

## India and the US to cooperate in achieving Kyoto goals through environment-friendly energy technologies

Bill Richardson, the US Energy Secretary, arrived at the head of a delegation to confer on 26 October 1999 with an Indian side led by Jaswant Singh, Minister of External Affairs. In a 'Joint Statement on Cooperation in Energy and related Environmental Aspects', the two sides recalling '... past cooperation that established the framework for several

joint initiatives between the two Governments and their agencies for research and development in the energy sector, as well as stimulated private cooperation in conventional energy projects in India', decided '... to further enhance their cooperation in the energy sector such as conventional energy projects, renewable energy, clean coal technology, energy

efficiency and related environmental aspects', and resolved '... to work closely together and with other countries, in keeping with the principle of common but differentiated responsibilities, to advance the goal of protecting the people of the world from the threat of climate change, while promoting economic growth...'