

## News Details

### **Wanted: A shot in the arm**

Feb 18, 2004

India could be the best manufacturer of weapons of mass protection - vaccines - because Prozac, Viagra and other affluent drugs preoccupy the multinationals, who have almost stopped funding fresh research.

If the weapons of mass destruction have caught the imagination of many, weapons of mass protection have also got a second lease of life, long after the United Nations championed their cause for public health in the mid 1980s. Yes, the weapons that can save millions of life and billions of dollars in the reduced cumulative cost of treatment, hospitalization and working days lost are vaccines.

While the West hung up its hat on developing new vaccines some time ago, countries like India are still struggling to protect its population from common diseases. There never has been a better time for vaccine development and implementation - over half a dozen vaccines are under advance stages of development in India with collaborations between the academia and industry. Consider this:

Vaccines for rabies, anthrax, rota virus, cholera, dengue, malaria, tuberculosis, combination vaccine for DPT and Hepatitis/Haemophilus Influenza Type B (HIB) are in different stages of pre-clinical and clinical trials. An immuno-modulation vaccine against leprosy is also now available from the labs of the National Institute of Immunology (NII) in Delhi.

Bharat Biotech International Limited (BBIL) launched typhoid vaccine, Typbar, early this year with the vaccinal strain of Salmonella typhi Ty2 being made available by the National Institutes of Health, US.

Indian Institute of Science (IISc) and Indian Immunologicals Ltd (Hyderabad) have developed the world's first combination vaccine for rabies and the company will soon undertake production of vaccines for both humans and animals. This vaccine contains a low dose of the traditional cell culture vaccine and the DNA vaccine and costs much lower than the existing ones in the market.

Serious, hopeful attempts are underway to produce improved vaccines for Japanese Encephalitis and tuberculosis. In the former, the currently available mouse brain-derived vaccine has limitations in terms of safety, availability and cost.

Indian research is in promising stages of producing a recombinant DNA vaccine.

Similarly scientists have very positive results for producing an improved TB vaccine, superior to the currently available BCG. India alone contributes 23 % to the global TB burden where 2.4 million deaths occur every year due to TB. HIV, the mother of all infections, has its sub-type C infecting Indian population and with the Union health minister announcing early this month, human trials for the Subtype C vaccine will begin early 2004.

While the Indian companies manufacturing vaccines -- BBIL, Shantha Biotechnics and Biological E Limited (all in Hyderabad), Wockhardt Limited (Mumbai), Panacea Biotec (Delhi), Serum Institute of India Ltd (Pune) -- are gearing up to meet international standards, the multinationals have almost stopped funding new vaccines.

Reason: it's economically not feasible and attractive for drug companies who are on the look out for blockbusters (perhaps like Prozac or Viagra) or invest in disease concerns of the affluent nations like asthma and arthritis to research for vaccines which would be largely consumed in poor nations.

This deficiency on the part of the big drug companies has been currently offset by charities and donations but it is argued that this will not be sustainable in the long run unless a sustainable system for vaccine development and manufacturing is devised which would take into account the correct economic value of vaccines. It is, therefore, an opportune time for Indian companies and the government to come together to put a case before the international community that India has the scientific capability and modern infrastructure to lead the global vaccine manufacturing.

Says, G Padmanaban, distinguished biotechnologist with DBT and professor emeritus at IISc, "One way of fighting infectious diseases worldwide is to shift global vaccine manufacture to developing countries like India which has already invested in research and development of vaccines. The best example is of the recombinant Hepatitis vaccine whose indigenous development and manufacture has led to a ten-fold drop in prices." With international assistance and supervision, Padmanaban argues, it would be possible for India and other countries to make conventional and modern vaccines at affordable prices.

The Indian pharmaceutical industry never had it so gratifying. World-class infrastructure and quality certification are not only allowing Indian vaccine manufacturers to work with WHO and UN agencies and supply in several countries but are also enabling forging of alliances with international research organizations.

A classic example of multi-pronged, multi-lateral initiative is the ongoing malaria vaccine programme in the country. Funded by the Bill and Melinda Gates Foundation through the Malaria Vaccine Initiative of PATH (Program for Appropriate Technology in Health (a US-based nongovernmental organization), it involves the efforts of the International Centre for Genetic Engineering and Biotechnology (ICGEB), and All India Institute of Medical Sciences both at New Delhi; Centre for Disease Control in Atlanta and Stanford University, US; other partners at Indo-US Vaccine Action Programme and BBIL.

Since there is no vaccine at all for malaria, which infects 300-500 million people worldwide, this collaborative initiative assumes a lot of significance and the results are awaited with great hopes and apprehensions. Two groups at ICGEB, led by Dr V.S. Chauhan and Dr Chetan Chitnis, have identified vaccine candidates for the two types of malarial parasite common in India: Plasmodium falciparum and Plasmodium vivax. The immune response elicited in monkeys is promising enough for the researchers to go for human trials, which should happen as early as 2004.

For the first time in India, testing sites are being developed in Orissa and baseline epidemiological data is being collected. So far so good, but nobody knows how successful the vaccine candidates will be in humans. However, Krishna M Ella, managing director BBIL, is very optimistic. "Due to international collaboration, thanks to Gates Foundation, results from a lot of simultaneous efforts in malaria vaccine across the world are being compared and contrasted. We are therefore hopeful of breaking the ice this time," Ella adds. What is more important is the learning process for Indian researchers and companies in such multi-lateral initiatives, he believes.

It is no secret that Indian companies or researchers have not produced any novel vaccine so far. Existing vaccine technology is being tweaked to serve our purpose. At the same time, despite the presence of the multinational vaccine heavyweights like GlaxoSmithkline, Merck, Aventis, Wyeth in India, no IPR-protected vaccine technology has been transferred to India. Breaking that jinx is the success story of Wyeth-BBIL alliance for producing HIB vaccine. "Indian pharmaceutical companies have created a bad name for themselves in that they cannot protect the IPR of global drug companies. We have proved that it is wrong and produced 2.5 million vials of H1B vaccine using Wyeth's high-end technology. Hopefully more such alliances should come forth," Ella avers.

Striking alliances for meeting global demands however requires all stakeholders to be Good Manufacturing Practices (GMP) compliant. "To meet this global standard (GMP), scientists need to be disciplined and change their mind sets to achieve excellence," observes Dr S.D. Ravetkar, senior director at Serum Institute of India Limited, Pune, the largest producer of vaccines in the country. As far as the government policies are concerned, a lot is left to be desired. Due to its lax regulatory policies, countries like Russia and China are dumping non-GMP-compliant cheap vaccines in India. And given the uninformed health-care system in the country, it's anybody's guess that these sub-standard, imported vaccines will find their way into people's lives.

Both scientists and industry feel the government should have a long-term agenda for vaccine development and administration. While those like Padmanaban feel something on the lines of universal childhood immunization through mid-day meal scheme should be embarked upon, industry feels the government should take vaccine programme seriously and allot more funds for health.

Says Dr Ravetkar, "Indian government needs to define its Biotech Policy very clearly and at the same time implement pulse vaccination programmes." Stopgap arrangements are made in times of epidemic spates. Dengue outbreak in Delhi and nearby areas at frequent intervals testifies this. No long term plan is chalked out. Malaria's case is not much different. A soft loan of \$200 million from the World Bank got spent in control measures like insecticide sprays, distribution of mosquito nets, awareness programmes et al, but no fund was allocated for research which can alone find long-term solutions, despite the World Bank stipulating that a certain percentage of the loan be used for malaria research.

Experts also argue that probably multinational pharmaceutical companies are influencing the government in treating Hepatitis-B vaccine as more significant than those for diseases like typhoid and dengue that are scourges of developing nations borne out of unhygienic water and food. Two shots of typhoid vaccine at an interval of 3 years can immunize one against this infection for life. Little surprise that our Chinese neighbours have declared themselves typhoid-free.

It makes little sense to depend on charities to devise strategies to manage lethal threats to poor nation's populations. Here's a chance to take up social responsibility, do global business, create sizeable market, make money and protect our own people: have a robust, politics-free, long-term vaccine programme. The World Bank indicated way back in 1983 that vaccination could be a first step to improved economies. It is proving to be one.

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