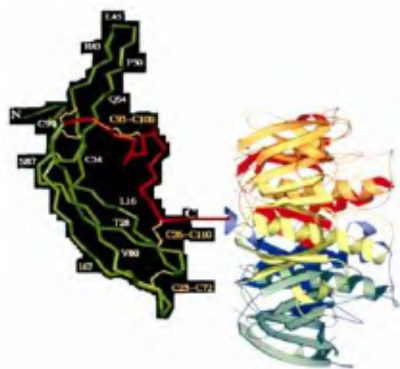


## In this issue

### Vaccine against human chorionic gonadotropin

The World Population Day was observed this year by the Union Ministry of Health and Family Welfare on 11 July, with the publicized intent of stabilizing population in the country by a variety of initiatives. Indeed India is growing at the rate of 15.5 millions, nearly equal to the entire population of Australia every year. In this context, conceptually new exploratory research was undertaken by G. P. Talwar *et al.* many years



ago to develop a birth control vaccine. The target chosen was the human chorionic gonadotropin (hCG), a hormone made by the early embryo soon after fertilization of the egg, which was believed to play a critical role in implantation of the embryo and thereby to the onset of pregnancy. The hypothesis was that in case the 'conceived' vaccine could generate antibodies competent to inactivate hCG, pregnancy would be prevented without impairment of ovulation and derangement of menstrual regularity and bleeding profiles, which are the undesirable side effects of steroidal pills, injectables, implants and intrauterine devices.

Women are normally immunologically tolerant to hCG. Talwar linked hCG beta to tetanus toxoid as a carrier. The conjugate generated antibodies not only against hCG, but also against tetanus, which caused high

maternal mortality in those years following deliveries in aseptic conditions of home or field. Limited clinical trials in tubectomized women provided support to the basic concept of the vaccine. Furthermore *in vivo* challenge with hCG showed that the antibodies thus formed, bound with the authentic purified hCG, without hCG *alone* acting as a booster. Had this happened, the internal boosting would have made antibody response irreversible. This was not the case with the strategy adopted.

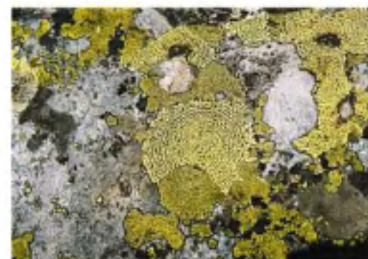
The immunogenicity of the vaccine was further enhanced by employing a heterospecies dimer of hCG $\beta$  annealed to alpha subunit of ovine LH. Phase II efficacy trials, the first ever on a birth control vaccine, were conducted in women of proven fertility, which provided hard evidence for the first time on prevention of unwanted pregnancy by the vaccine in women, who continued to ovulate and have regular cycles and normal bleeding profiles. These trials also defined the threshold titres required for contraception. A shortcoming of the vaccine was that it induced above protective threshold titres in 60–80% and not above 90% of women desirable for a birth control procedure.

Research on this vaccine was recently revived. The authors have made a recombinant vaccine amenable to large scale industrial production at low cost. Used along with *Mycobacterium indicus pranii* immunomodulator approved by the Drugs Controller General of India and USFDA for human use, it generates several fold higher titres than the protective threshold in 100% of mice tested. The article (page 169) is a review of this fascinating journey.

### Lichenometric studies

Few lichenometric studies regarding the Indian glaciers are available. Lichenometric studies in the glacier regions of Himachal Pradesh and

Garhwal Himalayas were carried out in the past. Recently, Joshi and Upreti (page 231) carried out lichenometric studies in the vicinity of Pindari Glacier in the Himalayas with the help of yellow-green coloured crustose lichen *Rhizocarpon geographicum* (L.) DC. The known growth rate of this species measures 0.2 mm/year. Being a saxicolous (growing on rocks) lichen, it grows luxuriantly on the exposed boulders and stones. The distance of 1 km from the Pindari Glacier snout was



divided into 21 transverse sections that separate from each other with a constant distance of 50 m. For maximum accuracy in the calibration the inner diameter of thallus growing on the boulders situated away from the common trekking route was measured. Within each section the largest lichen thallus diameter of *R. geographicum* was measured. The boulders located 1 km away from the glacier snout resulted in the minimum age of exposure as 550–600 years whereas the minimum assumed distance of 50 km estimates the age of moraines as 75 years. The earlier lichenometric studies were based on database and calibrated growth rate that generally requires a long-time period.

Apart from *R. geographicum*, other crustose species of lichens which also grow on rocks and form a more or less orbicular thallus are *Dimplelaena oreina* (Ach.) Norm., *Lecanora muralis* var. *muralis* (Schreb.) Rebenh. em. Poelt and *Xanthoria elegans* (Links.) Th. Fr., that can also be used in lichenometric studies after calibrating their growth rate.