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Editorial

CHANCE FAVOURS THE PREPARED MIND

Among the large variety of studies that Louis Pasteur (1822-1895) conducted was one on the bacteria which cause chicken cholera. Once he left cultures of these bacteria in the laboratory and went off on vacation, one of the very few that he took. When he returned from vacation and fed bacteria from the old cultures to the chickens, the chickens dutifully fell sick but recovered within a day. This was quite unlike all previous occasions when germs from fresh culture had been fed, which had led to death in one hundred percent of the cases. Assuming that something had gone wrong with the cultures during the vacation, fresh cultures were prepared and the experiments repeated. Some of the chicks who received bacteria from the fresh culture were those who had recovered from the 'vacation culture' earlier. Now came the surprise of surprises: while the chicks who received only the fresh culture got cholera, the chicks who had received the 'vacation culture' earlier *did not* get cholera. Pasteur turned to his collaborators Roux and Chamberland and said, "Don't you see that these animals have been vaccinated?" Unwittingly, Pasteur had discovered what soon became one of the standard methods of preparing vaccines. By repeated division in a culture medium, many pathogenic bacteria become 'attenuated', i.e. lose their pathogenicity while still retaining their immunogenicity. It is anybody's guess whether the mechanism of attenuation is similar to that which tames a wild animal who has been provided with love, care and predictably regular food supply. Be that as it may, exposure to an attenuated microorganism promotes primary immunisation without illness. The result is that subsequent exposure to a pathogenic microorganism with a similar antigenic potential evokes a secondary immune response, which is far more brisk and intense, and therefore, much more effective as a protective mechanism than the primary immune response. Although details of the episode are controversial, its basic elements are quite certain. For example, it is not sure whether Pasteur went on vacation before injecting the old culture (1) or after injecting the old culture (2). Recounting this episode is of special significance for the readers of IJPP because Indians, in general, suffer from more than their share of guilt when they go on vacation.

Pasteur was an untiring workoholic whose life was full of remarkable achievements. Starting with the discovery of dextro-and laevo-rotatory crystals of tartaric acid at age 26 to the invention of the first anti-rabies vaccine when he was 63, Pasteur remained a passionate seeker of truth all his life. He had a remarkable talent for putting the truths, and even half-truths, which he discovered, to use for human welfare. He suffered a brain haemorrhage when he was 45, which left the left side of his body partly paralysed for the rest of his life. But that did not affect his drive for work, or his vivid imagination. He gave several public demonstrations of his experiments, sometimes to satisfy his critics, and sometimes to win friends and admirers. While he did generate a large worshipful following, his exhibitionist tendencies and lack of modesty also gave him several enemies. However, unlike Galileo, he was lucky to work in an enlightened era, which gave him a good hearing, and a chance to prove himself right. Along with several successes, it was inevitable that he also had a few failures. But he was a scientific Phoenix who repeatedly rose from the ashes of his own mistakes (2). Although the genius behind his achieve-

ments was his own, his phenomenal output was the result of the support which his hard work received from his immensely loyal disciples, Roux and Chamberland, and his doting, long-suffering wife. We are honoured to pay this tribute to the author of the celebrated quote "Chance favours the prepared mind" during the hundredth year of his passing away.

REFERENCES

1. Kohn A. *Fortune or Failure : missed opportunities and chance discoveries.* Oxford : Basil Blackwell, 1989 : 57.

2. de Kruif P. *Microbe Hunters.* London : Jonathan Cape, 1927 (1963 reprint) : 65-116, 160-199.