

What Can We Learn from Stories of Hepatitis B Virus and Prions

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The 1976 Nobel Prize in physiology or medicine was awarded to Dr. Baruch S. Blumberg and Dr. Garleton Gajdusek for their discoveries concerning new mechanisms for the origin and dissemination of infectious diseases.

Initially, Dr. Blumberg was interested in studying the genetic polymorphisms in humans. By micro-Ouchterlony immunodiffusion techniques, he and his colleagues demonstrated a new antigen specific for Australian aborigines and designated as "Australian antigen" (AuAg). Study of the association of AuAg with diseases indicated that AuAg was prevalent in sera of leukemia and led to a wrong conclusion that AuAg is a good marker for the early diagnosis of leukemia [1965]. Through virological, immunological, molecular biological and epidemiological studies, it is now clear that AuAg is the surface antigen of hepatitis B virus and hepatitis B virus is a member of hepadnaviruses, which contains partially double-stranded circular DNA as the genome. A prospective study carried out by Dr. Beasley and his colleagues in Taiwan indicated that hepatitis B virus may play an etiological role in the development of hepatocellular carcinoma [1981]. Later, Dr. Chang and her colleagues had carried out a universal hepatitis B vaccination in Taiwan and the incidence of hepatocellular carcinoma was significantly reduced in children [1997]. This is the first paradigm in the human history that vaccination can prevent human cancer.

Kuru is an endemic syndrome similar to paralysis agitans in Australian Trust Territory of New Guinea. Dr. Gajdusek and Zigas firstly proposed that this disease may have a genetic etiology [1957]. However, through various experiments including animal transmissions, later on, Gajdusek proposed that Kuru may be a kind of slow virus infection [1967]. Today, with the efforts mainly contributed by Dr. Prusiner, in fact, Kuru is considered as a disease caused by prion (pronounced pree-on), a proteinaceous infectious particles instead of slow virus [1982].

To see is to believe. Many phenomena might be true at the time when they were discovered, however, they need further extensive and careful studies to support the hypothesis. This may be what we can learn from the stories of HBV and prions.

References

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