HIV and AIDS: Accurate and Detailed Identification for Better Survival Strategy

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Human immunodeficiency virus (HIV) is an infectious agent that gradually makes our ability to fight disease weaker. Ultimately, HIV causes the deadly Acquired Immune Deficiency Syndrome (AIDS). Every year many thousands of people from children to adults are being infected, therefore HIV is a major public health concern. This virus was first identified in the beginning of 1980s in the U.S.A. but the most affected populations are in sub-Saharan Africa. The infection transmits from person to person through various ways including blood, semen and even breast milk. Unprotected sex with infected individual, sharing needles and taking drugs are common ways of transmission. HIV is categorized into two types, HIV-1 being the most common. Infected individuals traveling to different countries and having unsafe sexual intercourse cause mixing of different HIV subtypes. Genetic materials are spread and the genetics of HIV-1 infection becomes more complex to identify. The HIV-1 subtypes are of different recombinant forms with distinct genetic assembly. Precise diagnosis is necessary to deal with the infection. For this, we need to understand how their genetic material is distributed and how they get changed in different individuals from different geographical regions. It is possible by considering almost the total length of their genome in two or three parts and deciphering the gene arrangement. The different recombinant forms could be analyzed in detail. Then it could be categorized considering both similarity and dissimilarity of the genetic material. The information could be used for developing a more accurate diagnostic approach and also for developing drug targets to treat the infection. The study identified different subtypes and their recombinant forms with a comprehensive method that considered genetic information from almost the complete length of the genome.

Like footprints in real life, biological systems have something similar. In HIV-1 infection, this could be named ‘antibody’ through which we get idea about the infection and its progression. When a person is infected with HIV-1 and the infection becomes persistent, the antibody level increases noticeably. From the elevated antibody level, it can be concluded that a patient is infected. But it is important to measure the antibody level accurately before making such a decision. In this study, a precise and sensitive method was applied that is based on the ability of light emission. Based on antibody level, the light emitting intensity varies. Thus, we proceed to distinguish antibody levels for different infected individuals. In migrating individuals, HIV-1 subtypes are mixed and they form recombinant forms. The relationship between the antibody level and different subtypes was observed. It is found that they have no significant relationship. The footprint of the infectious disease (antibody level) can yield information on the phase of infection.