



The Origins of HIV

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Abstract

If you want to eradicate deadly virus epidemics, you must clearly understand the origin of this virus. This is a basic issue for anti-HIV vaccines and therapeutics. The HIV origin studies, though limiting, are still one of the leading frontiers in the field of HIV/AIDS researches. This editorial discusses some hypothetical topics devoting to discovery of HIV origin and illustrates different routes of HIV transmissions among human populations.

Keywords: Origin of HIV; HIV; Wild life; Primate; Zoonosis; Human transmission; Deadly virus; HIV epidemics; Medications

Introduction

Backgrounds

The origin of HIV is an important topic for HIV/AIDS studies. Since a great deal chances for HIV origin may not come from human beings themselves, pursuing real outside invaders to human bodies are indispensable parts of future directions. As being widely speculated, many natural resources, such as foods, vegetable, water, sanitary systems, medications, food-borne microbial, pollutants, plants, insects or animals etc can transmit pro-HIV virus into healthy human bodies and finally create AIDS symptoms for patient's deaths. Yet, no breakthrough has been currently achieved. In this editorial, some hypotheses and current discoveries have been addressed. Moreover, possible future trends are highlighted.

Across the history, many discoveries have proved that deadly viruses to humans are coming from outside invaders. For examples, human plague (black death) is coming from rodents and rabies virus is coming from cats or dogs [1,2]. The origin of HIV is an important topic for HIV/AIDS studies. The first question related with AIDS must be when the first HIV entered into human bodies and later transmitted among human populations. Until now, there is no satisfactory answer has been found. As being widely speculated, many natural resources, such as foods, vegetable, water, sanitary systems, medications, food-borne microbial, pollutants, plants, insects or animals etc can transmit pro-HIV virus into healthy human bodies and finally create AIDS symptoms for patient's deaths. Now, only some hypotheses have been raised.

Method

Currently, five different mechanisms of origin have been hypothesized: (i) zoonosis theory [3]; (ii) serial passage of the SIV theory [4] and (iii) chemical stress-induced evolution [5,6]; (iv) insects or animal biting; (v) integrated modular.

HIV as a zoonosis (from foods)

It has been hypothesized that humans obtain first HIV from animal sources. Animals, such as monkeys, gorillas or chimpanzees that have infected with SIV but show no sign of infections. Then these humans will carry SIV and further transform into HIV [4]. This hypothesis is supported by following evidence: (i) similarities in viral genome

organization and close phylogenetic relationships between SIV and HIV; (ii) SIV prevalence in natural host; (iii) geographic coincidence; (iv) plausible routes of pro-HIV transmission (animal meat eating). This is a prevailing hypothesis about the origin of the HIV in humans. The most relevant clue supports this hypothesis. The origin of AIDS patients worldwide came from Africa—the wild animal eating continent. However, the most important drawback of this hypothesis comes from the statement why until 20th century the AIDS epidemics begin. If animal eating is the leading cause of the origin of HIV, the AIDS epidemics would occur several hundred years ago during slave trade period.

Since HIV is divided into HIV1 and HIV2, if AIDS is zoonosis, some patients ought to carry both HIV1 and HIV2. However, it is rarely found that a human contains both HIV1 and HIV2. [3]

Serial passage of the SIV into HIV theory

One hypothesis suggests that the origin of HIV infections in human bodies may not be HIV virus. Other viral infections in human bodies gradually become HIV virus by viral genomic mutations, translocations and evolutions. This is a workable hypothesis that needs to be smartly verified [4].

The hypothesis of chloroquine application

To better argument of this statement, a hypothesis that widespread applications of antimalaria drugs, quinine derivative promote the origin of HIV. This hypothesis is based on the evidence of parallel occurrence between anti-malaria agents and break of AIDS epidemics at 40-50s, 20th century. But this hypothesis lacks the pathogenesis evidence supports [5,6].

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Other organism, insect or animal biting modular

Apart from infections from food or water contaminations, organism, insect or animal biting may also transmit HIV from other living systems into human bodies. This type of processes and pathways has many good examples, such as malaria and yellow fever from mosquito and rabies from cats or dogs. Previously, similar example can be found from rabies infections in human being worldwide. These bite episodes can be found by organisms, insects and animals. Thus this underdog hypothesis ought to be paid increasing attentions [2].

Cooperative transforming models

Cooperative transforming models can not be neglected. It is not a nullified idea. For example, we can imagine that pro-HIVs are coming from foods (zoonosis) or animal biting. After long silence, these pro-HIV viruses (like SIV) will gradually acquire immune-deficient functionalities (such as HIV-1 or HIV-2). These possibilities should not be ruled out at this stage of HIV origin studies.

Discussions

The biggest drawback of hypotheses about zoonosis (from food intake) or devil's kiss (from insect or animal biting) is why HIV was found just recently while these two types of viral infection processes may last for very long history (several centuries). As a result, we argue that cooperative models may better explain better. Yet cooperative models are more difficult to verify than single process courses.

Comparisons and verifications of acting hypotheses and identifying the real courses of HIV origin is an indispensable ways for HIV epidemics control. Useful counteractive measures and strategies may come from such hypothesis and scientific investigations.

Future directions

Since these types of HIV origination studies, however, are foundational investigations, no remarkable financial benefits may be obtained. Thus, this is very difficult to gain enough funds in developing countries, even in developed countries [7,8]. This is why most relevant hypotheses are still in their infancy. No obvious breakthrough has been achieved. Considering its medical significance, worldwide cooperation may be a future solution.

Conclusion

Until now, the origin of HIV is still unsolved and reaches widely agreements. AIDS symptoms seem to be not a zoonosis only, but human infection disease progressions. Some real sources of HIV infections have not been outlined herein. But we should be vigilance on this matter as long as the final discovery of this issue.

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