HIV: Current Research
ISSN: 2572-0805

Review Article Open Access

The Origins of HIV: A Promising Medical Topic

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Abstract

The origin of HIV is still an enigma of biological science and a big medical challenge up to now. Without this discovery, we can never have an opportunity to rule out any future HIV outbreak worldwide. The HIV origin studies are still one of the leading frontiers in the field of HIV/AIDS researches. Currently, at least five different mechanisms of HIV origin have been hypothesized: (i) zoonosis theory; (ii) serial passage from the SIV theory; (iii) chemical stress-induced evolutionary ones; (iv) via insect or animal biting arguments; (v) integrated modular and so on. But no conclusive outcome has been made on the field of HIV origin studies. This editorial discusses a series of these hypothetic/experimental topics devoting to discover each topic of HIV origin explanations in historical orders.

Keywords: Origin of HIV; HIV; Wild life; Primate; Zoonosis; Human transmission; HIV epidemics; Viral medications; Human infection

Introduction

If you want to eradicate a series of deadly viral epidemics, you must first clearly understand the origin of this virus. Accordingly, the knowledge of viral transmission (spread) among large human populations is also noteworthy. As a result, the origin of HIV is an important topic for HIV/AIDS studies. But, no conclusive agreement has been made in the field of HIV origin studies until now. Since a great deal of chances for HIV origin may not come from human beings themselves, pursuing and pinpointing the real outside invaders into human bodies are indispensable parts of future scientific investigations of HIV. Yet, no breakthrough has been currently made in this topic despite many published literatures and small-scale scientific achievements. In this editorial, we will outline some of previous hypotheses and recent discoveries on this issue. Possible future trends are also highlighted.

Historic Backgrounds and Progressive Information

Across the long history of human civilization, many discoveries have suggested that deadly viruses to humans are possibly coming from origins outside of human beings. For examples, human plague (black deaths) is proposed to be come from rodents. Rabies virus is widely known to be come from cats or dogs while these animals bite healthy human bodies unexpectedly [1,2]. As a result, the origin of HIV is an important topic in the field of HIV/AIDS studies.

Some Types of Present HIV Origin Arguments

The origin and evolution of HIV is an important subject in AIDS researches [3]. Generally speaking, a great number of pathways or routes can be traced for solving the enigma of HIV origin. This chapter only gives some of them (easiest notified ones). Currently, a number of different mechanisms of origin routes have been formally hypothesized: (i) zoonosis theory [4]; (ii) serial passage of the SIV in primate or humans [5] (iii) chemical stress-induced evolutionary ones [6,7] (iv) via pathways of microbial, insect or animal biting [2]; (v) integrated modular [3]. A number of available debates have been displayed along with these hypotheses but no universal agreement between audience and critics has been reached owing to lack of compatible experimental/clinical evidence up to now.

HIV as a zoonosis origin (from foods)

It has been hypothesized that human beings may obtain the first HIV from animal sources—widely agreed among researchers owing to be easily recognized. Animal meats, such as monkeys, gorillas or chimpanzees that have infected with SIV but look healthy may be consumed by ordinary human beings living in wild-states of Africa. Then these primate-eating human beings will carry SIV and further gradually transform into the HIV [5]. This hypothesis is supported by following evidence: (i) similarity of viral genome sequencing and organization between HIV in human beings and SIV in primate animals. Close phylogenetic relationships between SIV and HIV is the strongest supporting evidence for this hypothesis; (ii) SIV prevalence in natural primate hosts; (iii) geographic coincidence; (iv) plausible routes of pro-HIV transmission in natural states (animal meat eating). This is a prevailing hypothesis about the origin of the HIV in human beings from most medical literatures. The most relevant clue supporting this hypothesis is the origin of AIDS patients worldwide came from Africa—where the wild animals are commonly eaten in affected continent and most primates in the world are aggregated. However, the most important drawback of this hypothesis comes from the statement why until 20th century (AD1981) the AIDS epidemics just began. 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 in US [4].

Serial passage of the SIV into HIV theory

One argument suggests that the origin of HIV infections in human bodies may not be HIV virus directly coming from outside sources (natural HIV reservoirs). Other virus infections in human bodies gradually become HIV virus by viral genomic mutations, translocations and evolutions [5]. It is a more workable and practical hypothesis than zoonosis hypothesis, which needs to be smartly verified. The virus silence and passages in human bodies can be very long (even linger along for half of human life). Thus, detections and monitoring of long passage of different viruses in living body—sequencing similarity and

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Received October 19, 2016; **Accepted** October 23, 2016; **Published** October 30, 2016

Citation: Lu DY, Wu HY, Yarla NS, Lu Y (2016) The Origins of HIV: A Promising Medical Topic. HIV Curr Res 1: 116.

diversity of the HIV are targets of future HIV/AIDS studies, especially for disease originations and epidemic control.

The hypothesis of chloroquinine applications (chemical stress)

To better argue the statement of a strangest historic event, a novel hypothesis displayed for a widespread application of antimalaria drugs, that a series of quinine derivatives might be an indispensable factor for promotions and origin of the HIV. It is a coincidence of both time-scale and geologic locations. This hypothesis is based on the historic evidence of parallel occurrence between widespread anti-malaria agent utilities and a mathematical model tracing for origin of first AIDS patient at 40-50s, 20th century. This is a special case of clinical evidence but no biological pathways or therapeutic mechanisms of action for quinine derivatives available now. In addition, this hypothesis lacks the strongest and direct experimental evidence supporting both earliest initiation of first HIV origin, pathogenesis evidence and pharmacological/toxicological mechanisms of action in this stage. This idea is a bold and creative idea without giving a workable layout for further scientific verifications. As a possible model, this argument opens a door for this kind of medical hypothesis and scientific investigations based on statistical analyses. It is a hypothesis that needs growing experimental/clinical data for supporting and guiding to the future researchers.

Environmental threat (organism, insect or animal biting modular)

Apart from infections from food, water and other contaminations, organism, insect or animal biting may also be a vehicle for transmitting or spread of the HIV from other living formation/systems into healthy human bodies. This pattern of pathologic processes and pathways has many good examples, such as malaria and yellow fever from mosquito biting and rabies from cat or dog scratch or biting. Previously, a number of similar examples can be available besides infections from dogs into human being worldwide. These bite episodes can be found by organisms, insects and animals. Thus this underdog hypothesis ought to be paid off growing attentions in the field of HIV origin studies and other important viral epidemics, such as Ebola [1,2], avian flu [8-10] and Zika endemics worldwide now [11,12].

Cooperative transforming models

Cooperative transforming models cannot be neglected. It is suggested that collective pathways may induce the HIV epidemics in humans. Created by us, we believe that idea is not point-less. It opens a door of new form of mind-set. 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 to pathogens, such as HIV-1 or HIV-2, (serial passage model or other environmental factors). These possibilities should not be ruled out at this stage of HIV origin studies. However, these theoretical models are new ways of ideology that infections cannot be easily found by present techniques and large-scale data analytical capabilities. Though no new route has been suggested, it is a fittest model in the course of HIV origin and epidemics as we can imagine. Much similar creative ideas need to be given and proved [13-15].

The biggest drawback of hypotheses about zoonosis (from food intake) or via 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 present situations and suitable solutions for this drawback. Yet cooperative models are more difficult to verify than other single process arguments (Figure 1).

How to Preventive or Interfere the HIV Residence and Spread in Human Beings

To prevent or eradicate the HIV resident in human bodies, many

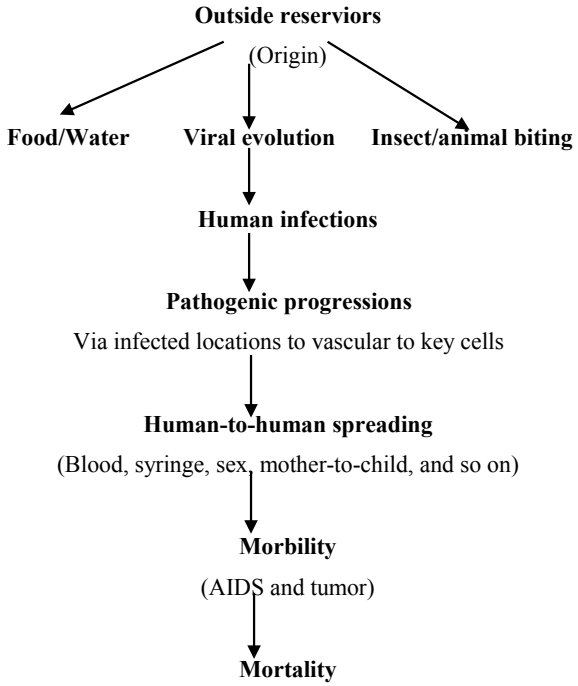

Figure 1: Possible modular of HIV origin and human-to-human transmissions.

HIV-origin hypotheses need to be carefully surveyed and should not be overlooked. Based on in-depth understanding the HIV origin hypotheses and therapeutic utilities, proper preventive measures can be established to counteract all possibilities of HIV infection, spread and epidemics from outsider invasions. Finally clearance of HIV infections and residence in human bodies needs to be solved as early as possible. Reducing HIV transmissions among human beings plays key role for HIV infection treatments and managements. To shrink HIV/AIDS epidemics, cutting down HIV transmissions among human populations is indispensable. To attain this goal, every possible route or pathway must be studied one by one. Previously, blood donation, homo- or hetero-sexuality, contaminated syringes, drug abuse and mother-to-child pathways and so on have been established already. But following pathways, as we can image, are still skeptical;

1. Respiratory tract transmissions (from contaminated air and space without masks)
2. Infect HIV virus from the different types of touch among people, e.g. public bathing or swimming pools, public utensils, public sporting facilities and so on
3. Contract infections from pollutants (such as urine, feces, contaminated cloth washing)
4. Viral transmission via medias of other insects, such as mosquito (re-verification) and others

If some susceptible human beings with obvious wound might be infected the HIV via above-mentioned pathways. Systematic and scientific investigations of these transmission pathways may help us to shrink, control or even eradicate HIV epidemics from their sources. But it is always easier said than be done. Almost no new discovery has been achieved in the past decade in this respective. Is it no relationships between these contacts and HIV spread pathways or are we too absent-minded to study a problem persistently and effectively?.

Since transmissions of pro-HIV or HIV from environments into

human bodies can be multi-factorials, we must not satisfied when one or two transmitting pathways have been discovered. Persistent monitoring the complex characters of multiple environmental factors of all possible HIV-related resources is much needed and indispensable. Though these kinds of studies are very important, the decisive discoveries relevant to this matter are greatly lacking until now. Many important reviews about HIV/AIDS studies published by world-leading medical journals or books have little such contents. It is a regretful phenomenon. If we do not know all possible routes that pro-HIV transmit to human bodies, the HIV/AIDS epidemics can be outbreak again and again at any future times. Presently, the researches about the HIV origin are somewhat too little and too late. Future perspective must emphasize on the matter.

Conclusion

Until now, the origin of HIV is still an unsolved enigma. Currently, the HIV origination argument is not widely accepted among audience and medical critics. HIV origin seems not only to be a zoonosis process only, but also accompany with human viral infection progressions and deadly symptom acquisitions. Some real sources of HIV infections have not been outlined herein. But we should be vigilance on this matter as long as the final managements of this issue forever.

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