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## บทบรรณาธิการ

รายงานประจำสัปดาห์ฉบับนี้ มีเรื่องเกี่ยวกับโรค AIDS คือเรื่อง Human T-Lymphotropic Virus Type III/Lymphadenopathy Associated Virus: Agent a Summary Statement และ " ยุงไม่แพร่เชื้อโรคเอดส์" เพื่อให้ทันต่อเหตุการณ์และวิทยาการที่ก้าวหน้า อันจะเป็นแนวทางในการดำเนินการโรคนี้ต่อไปในอนาคต

## บทความ

### Human T-Lymphotropic Virus Type III/ Lymphadenopathy-Associated Virus: Agent Summary Statement

#### INTRODUCTION

In March 1984, CDC and the National Institutes of Health (NIH), in consultation with scientists, physicians, and public health workers in academia, industry, and government, published a manual entitled *Biosafety in Microbiological and Biomedical Laboratories* ("biosafety manual")\* (1). The manual describes combinations of standard and special microbiologic practices, safety equipment, and facilities recommended for working with infectious agents in various laboratory settings. The recommendations are advisory and provide a voluntary code of safety practices.

A section of this manual is devoted to a number of specific "agent summary statements" consisting of brief descriptions of documented or anecdotal laboratory-associated infections, the nature of the laboratory hazards, and recommended precautions to be taken in handling and working with certain infectious agents. Contributors to the manual recognized that new agents would be discovered from time to time and recommended that a summary statement for each new agent be developed and published in the *MMWR*. The summary statement for human T-lymphotropic virus type III/lymphadenopathy-associated virus (HTLV-III/LAV)<sup>†</sup> follows. All laboratory directors are requested to put a copy of this summary in each of their copies of the biosafety manual and bring it to the attention of laboratory personnel. The recommendations in the summary statement were compiled from published scientific reports and are consistent with the published guidelines for health-care workers (2-4).



**AGENT SUMMARY STATEMENT: HTLV-III/LAV**

As of August 15, 1986, no cases of acquired immunodeficiency syndrome (AIDS) that meet the CDC case definition and can be attributed to an inadvertent laboratory exposure have been reported in laboratory workers (5). One laboratory worker (7) was included among the health-care workers who have had HTLV-III/LAV antibody detected in their serum after sustaining a needlestick injury (2,3,6-10), but the source of the infection could not be established. Persons who are infected with HTLV-III/LAV may be asymptomatic, may have AIDS-related complex, or may manifest symptoms of overt AIDS (11).

In 1985, two different reagent production laboratories reported that several laboratory workers may have been inadvertently exposed to an aerosol of concentrated HTLV-III/LAV; one worker was cut by a piece of glass from a broken carboy that contained HTLV-III/LAV-infected cells and culture fluid. None of the potentially exposed persons had shown evidence of seroconversion after 6 months in one incident and 12 months in the other as a result of these occupational exposures.

Other reports dealing with HTLV-III/LAV infection in health-care personnel, including laboratory workers (3,4,6,8-10), indicate that the risk of bloodborne transmission from inadvertent exposure is considerably less for HTLV-III/LAV than for hepatitis B virus infection. These reports illustrate the need for complete evaluation by a physician and serologic testing of each laboratory worker definitely or possibly exposed to HTLV-III/LAV in a laboratory setting. It is recommended that the Public Health Service guidelines for health-care workers be followed in these instances (2,3).

**Laboratory Hazards**

HTLV-III/LAV has been isolated from blood, semen, saliva, tears, urine, cerebrospinal fluid, brain tissue, and cervical secretions and is likely to be present in other body fluids, secretions, and tissues of infected humans or experimentally infected nonhuman primates. Percutaneous or parenteral inoculation and direct contact of cuts, scratches, abrasions, or mucosal surfaces with suspensions of virus or specimens containing live virus are considered potential routes of infection. Possible transmission of infection via the parenteral route can occur through self-inoculation with needles, broken glass, or other sharp objects that contain HTLV-III/LAV. Spillage is a possible means of exposure and infection, especially spills accompanied by spraying or splashing of infected cell cultures, viral concentrates, and other infectious materials that may come into direct contact with abraded skin or mucous membranes of the eyes, nose, or mouth; however, there are no data documenting or suggesting that transmission of HTLV-III/LAV has occurred in this manner. Ingestion and inhalation have not been documented as modes of transmission of the virus.

**Recommended Precautions**

1. Biosafety Level (BSL) 2 standards and special practices, containment equipment, and facilities as described in the CDC-NIH biosafety manual are recommended for activities involving clinical specimens, body fluids, or tissues from humans or laboratory animals that may contain HTLV-III/LAV. *These are the same practices recommended for all clinical specimens.* Emphasis is placed on the following practices, which are included in the manual (1):
  - a. Use of syringes, needles and other sharp instruments should be avoided if possible. Used needles and cutting instruments should be discarded into a puncture-resistant container with a lid. Needles should *not* be resheathed, purposefully bent, broken, removed from disposable syringes, or otherwise manipulated by hand.
  - b. Gloves should be worn by all personnel engaged in activities that may involve skin contact with potentially infectious fluids, tissues, or cultures and by laboratory workers with dermatitis or other lesions on the hands who may have direct or indirect contact with potentially infectious materials. Handwashing with soap and water should be a routine practice immediately after direct contact with potentially infectious materials and on completion of work, even when gloves are worn.
  - c. Generation of aerosols, splashes, and spills of potentially infectious materials should be avoided in procedures involving body fluids or tissues, during necropsy of cadavers, and in similar procedures on animals experimentally infected with HTLV-III/LAV. Laboratory workers should use a biological safety cabinet when propagating the virus to further



reduce the risk of exposure. Although the major precautions are listed here, the CDC-NIH biosafety manual contains additional related precautions (see pages 11-13 for BSL 2 and pages 14-17 [1] for BSL 3 when large volumes or concentrates of HTLV-III/LAV are involved). In all instances, the laboratory director is responsible for assessing the biosafety level to be used.

- d. Human serum from any source that is used as a control or reagent in a test procedure should be handled at BSL 2 (see pages 11-13 [1]). Appended to this Agent Summary Statement is a statement (Addendum 1) issued by CDC on the use of all human control or reagent sera shipped to other laboratories. The Food and Drug Administration requires that manufacturers of human serum reagents use a similarly worded statement.
- e. Animal BSL 2 practices, containment equipment, and facilities are recommended for activities involving nonhuman primates experimentally infected with HTLV-III/LAV. Laboratory coats, gowns, or uniforms should be worn by laboratory workers, as is customary for other BSL 2 or 3 practices, depending on the nature of the work, concentration of the virus, and volume of material being handled. Because many animals bite, and some throw feces, urine, or expectorate at humans, animal-care personnel must wear coats, protective gloves, coveralls or uniforms, and face shields as appropriate to protect the skin and mucous membranes of the eyes, nose, and mouth from potential exposure to these substances when working with animals likely to manifest such behavior.
2. Activities such as growing research-laboratory-scale amounts of HTLV-III/LAV or related viruses or virus-producing cell lines, working with concentrated virus preparations, or conducting procedures that may produce droplets or aerosols should be performed in a BSL 2 facility with the additional practices and containment equipment recommended for BSL 3 (12).
3. Activities involving industrial-scale, large-volume, or high-concentration production and manipulation of HTLV-III/LAV are to be conducted with BSL 3 requirements (12).
4. All laboratory glassware, equipment, disposable materials, and wastes suspected or known to contain HTLV-III/LAV must be decontaminated, preferably in an autoclave, before washing, discarding, etc. Incineration of solid wastes may be used as an alternate method of disposal.
5. There is no evidence that laboratory clothing soiled with materials known or suspected to contain HTLV-III/LAV poses a transmission hazard, and the handling of such clothing is covered under BSL 2 practices. However, to be consistent with BSL 3 recommendations (1), when laboratory clothing becomes contaminated with HTLV-III/LAV preparations, it should be decontaminated before being laundered or discarded.
6. Work surfaces should be decontaminated at the end of each day on completion of procedures or when overtly contaminated. Many commonly used chemical disinfectants with such active ingredients as sodium hypochlorite, formaldehyde, glutaraldehyde, or phenols (4, 13-15) can be used to decontaminate laboratory work surfaces; they can also be used to decontaminate some laboratory instruments, specific areas of contaminated laboratory clothing, and spills of infectious materials. Prompt decontamination of spills and other overt contamination should be standard practice.
7. The prudent and recommended approach to handling human serum known or suspected to contain HTLV-III/LAV is to use the same precautions that should be used routinely to prevent transmission of bloodborne infections, including hepatitis B (16). Available data on the effectiveness of heat to destroy HTLV-III/LAV suspected or known to be present in human serum are at variance because of variations in volume of serum, concentration of the virus, temperature, and duration of exposure to heat (14, 15, 17). Similarly, results of chemical analyses or antibody assays may vary when sera are heated before testing according to the analysis or assay being performed (18-20). However, there is agreement that testing heated serum for HTLV-III/LAV antibody by enzyme immunoassays often yields false-positive results (21-23).
8. No HTLV-III/LAV vaccine has been developed, and no drugs have been shown to be safe and effective for therapy. As part of an ongoing medical surveillance program for employees, all laboratory workers before being assigned to activities with a high potential for exposure should have a serum sample obtained and stored at -40 C (-40 F) for possible



- future testing. Subsequent serum samples should be obtained and stored in accordance with laboratory policy or following an inadvertent laboratory exposure involving materials described above. When indicated, these serum specimens should be tested by a qualified laboratory using currently recommended procedures for HTLV-III/LAV antibody. Furthermore, the physician requesting serologic testing of these serum specimens must first obtain informed consent from the laboratory worker and describe the confidentiality safeguards available to protect test results. The laboratory workers whose serum specimens are to be tested should understand how the test results are to be used, the implications of a positive or negative test result, and the limits, if any, of the confidentiality safeguards. An employee whose serum HTLV-III/LAV antibody test is reactive and whose subsequent tests and evaluation confirm the presence of HTLV-III/LAV infection should be counseled to follow the Public Health Service recommendations for preventing transmission (24,25).
9. In addition to HTLV-III/LAV, other primary, as well as opportunistic, pathogenic agents may be present in the body fluids and tissues of persons who are antibody positive or have AIDS-related complex or AIDS. Laboratory workers should follow accepted biosafety practices to ensure maximum protection against inadvertent laboratory infection with agents other than HTLV-III/LAV that may also be present in clinical specimens.

*Reported by Div of Safety, National Institute of Allergy and Infectious Diseases, National Cancer Institute, National Institutes of Health; AIDS Program, Hospital Infections Program, Center for Infectious Diseases, Laboratory Program Office, Office of Biosafety, Office of the Director, CDC.*

#### ADDENDUM

CDC cautionary notice for all human serum samples used as controls or reagents:

**WARNING:** Because no test method can offer complete assurance that laboratory specimens do not contain HTLV-III/LAV, hepatitis B virus, or other infectious agents, this specimen(s) should be handled at the BSL 2 as recommended for any potentially infectious human serum or blood specimen in the CDC-NIH manual, *Biosafety in Microbiological and Biomedical Laboratories*, 1984, pages 11-3.

One or more of the following statements should be included with the above warning statement:

- This specimen is negative for hepatitis B surface antigen (HBsAg).
- This specimen is negative for antibody to HTLV-III/LAV.
- This specimen is positive for hepatitis B surface antigen (HBsAg).
- This specimen is positive for antibody to HTLV-III/LAV.
- This specimen has NOT been tested for hepatitis B surface antigen (HBsAg).
- This specimen has NOT been tested for antibody to HTLV-III/LAV.
- This specimen has been heated at 56 C (133 F) for 30 minutes (which will not inactivate HBsAg but will inactivate HTLV-III/LAV).

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P 540 - 542, 547 - 548

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## บทควาห

### ยุงไม่แพร่เชื้อโรคเอดส์

#### Mosquitoes do not spread AIDS

เป็นที่ทราบว่าการติดเชื้อไวรัส HIV เข้ากล้ำมโดยเข็มฉีดยาที่แปดเปื้อน เลือดที่มีเชื้อไวรัสโรค AIDS อยู่สามารถแพร่เชื้อได้ ทำให้เป็นที่สงสัยกันว่ายุงอาจจะเป็นตัวแพร่เชื้อโรค AIDS ได้ด้วยหรือไม่

เมื่อเร็ว ๆ นี้ Dr. Jean Claude Chermann แห่ง Pasteur Institute กรุงปารีส ได้ศึกษาแมลงจากประเทศซาอี ( Zaire) พบสารทางพันธุกรรมคล้าย ๆ กับสารทางพันธุกรรมของไวรัสโรค AIDS ในแมลงเกือบทั้งหมดที่ศึกษา ส่วนแมลงจากประเทศ Central African Republic 30 species เขาพบสารนี้ในแมลง 2 species เท่านั้น ได้แก่อยุงและหมีด และยังพบว่า receptor ต่อไวรัสโรค AIDS ใน cell แมลงจากอแอฟริกามีลักษณะเหมือน receptor ต่อไวรัสโรค AIDS ในคนแต่เขาไม่พบสารทางพันธุกรรมและลักษณะ receptor ดังกล่าวในแมลงจากประเทศฝรั่งเศสเลย

จากการที่เขาได้ศึกษาและพบสารทางพันธุกรรมของแมลงสาบ ซึ่งเป็นสัตว์ไม่ได้ดูดเลือดคนก็มีลักษณะเหมือนของไวรัสโรค AIDS ทำให้สามารถอธิบายได้ว่าสารที่พบในยุงไม่น่าจะมาจากการที่ยุงไปดูดเลือดคนที่มีเชื้อไวรัสโรค AIDS และอีกเหตุผลหนึ่งที่จะช่วยสนับสนุนว่าแมลงไม่ได้เป็นตัแพร่เชื้อโรค AIDS ก็คือยุงไม่ได้เลือกกัดคนในวัยใดวัยหนึ่ง แต่เราพบโรค AIDS น้อยมากในกลุ่มเด็กโต เพราะเป็นกลุ่มที่ไม่เสี่ยงต่อการติดเชื้อจากการมีเพศสัมพันธ์เหมือนผู้ใหญ่ หรือเสี่ยงเหมือนเด็กทารกที่ติดเชื้อมาแต่กำเนิด

อาจเป็นไปได้ว่ายุงดูดเลือดคนที่มีเชื้อไวรัสโรค AIDS แล้วไปกัดอีกคนหนึ่ง อาจจะแพร่เชื้อสู่คนนั้นได้ แต่เหตุการณ์นี้จะเกิดก็ต่อเมื่อยุงนั้นดูดเลือดไม่อิ่มเท่านั้น ถ้ามันดูดอิ่มแล้วมันจะไม่ได้กัดอีกคนจนกว่าจะย่อยของเก่าหมด แต่โอกาสที่ยุงจะได้เลือดที่มีเชื้อติดปากไปก็น้อยมากเช่นกัน เพราะมีการศึกษาหลายอันเกี่ยวกับปริมาณเชื้อไวรัสในเลือดผู้ป่วยโรค AIDS ต้องใช้เลือดจำนวนมากจึงจะพบเชื้อไวรัส



Dr. chermann ยอมรับว่าผลการศึกษาครั้งนี้ก่อให้เกิดคำถามตามมามากมาย  
กว่าคำตอบ ความรู้ในเรื่องนี้จะช่วยพัฒนาหาวิธีการรักษาโรค AIDS และอาจเป็นไปได้  
ที่จะสามารถคิดค้นยาปฏิชีวนะต่อโรค AIDS ได้ จากการที่ receptor ต่อไวรัสโรค  
AIDS ในแมลงเหมือนกับ receptor ต่อไวรัสโรค AIDS ในคน

( แปลและเรียบเรียงจากบทความในหนังสือพิมพ์ Bangkok Post, Friday  
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