

Laboratory Diagnosis of HTLV-1

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Overview

- **History**
- **Human T-lymphotropic virus-1 (HTLV-1)**
- In 1979 was described by Poiesz and Co-workers

- **Virology**
- Subfamily → **Orthoretroviridae**, Genus → ***Deltaretrovirus***
- Enveloped, Diploid plus-strand RNA is **9034 bp**, about **100 nm**
- To date, four types (**HTLV-1, HTLV-2, HTLV-3, HTLV-4**)

Genomic structure

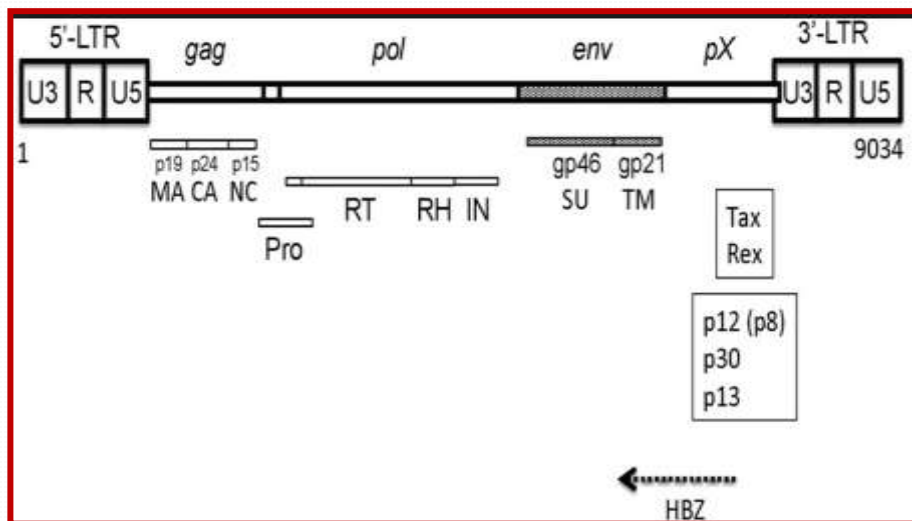
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- **Gag**, Encodes the virion core proteins (**NC, MA, CA**)
- **Env**, Virion entry into host cell, surface protein (**SU**), transmembrane protein (**TM**)
- **Pol**, Reverse transcriptase (**RT**), integrase (**IN**), RNase H (**RH**)
- **Tax**, Enhances transcription of viral and cellular genes
- **Rex**, Regulation of viral protein expression

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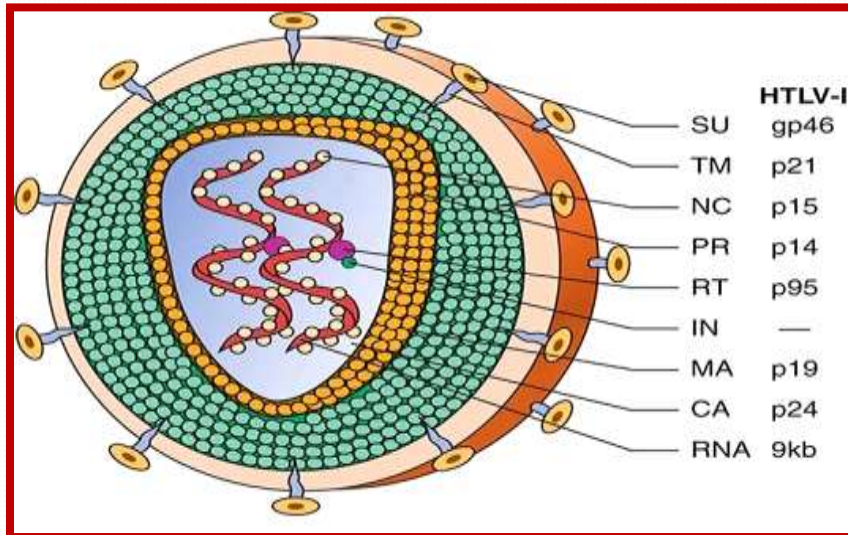
Molecular organization of HTLV-1

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Schematic structure of HTLV-1



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Laboratory diagnosis of HTLV-1

- **Screening test:** detection of specific antibodies

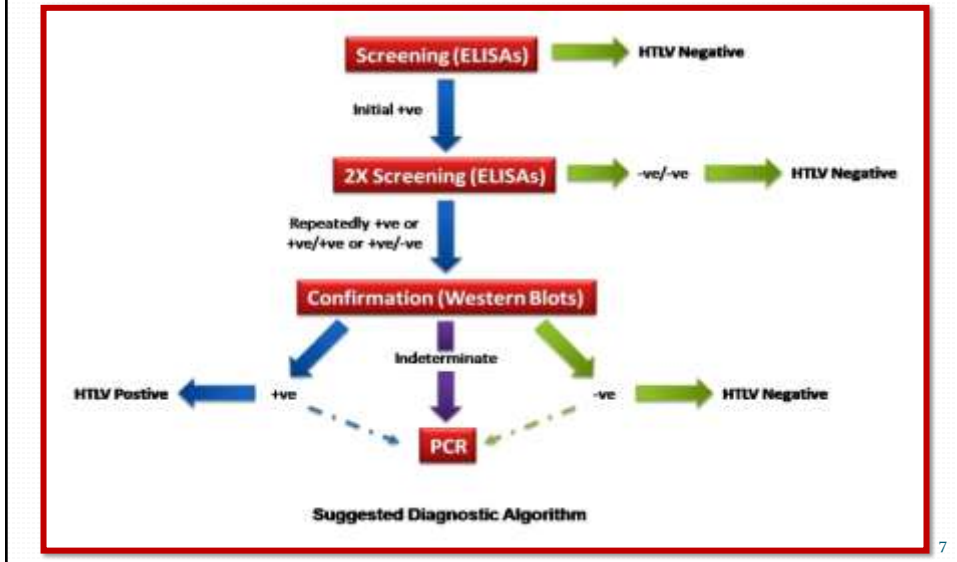
ELISA (Anti-HTLV-1&2)

- **Confirmatory test:** Western blot (**WB**), Polymerase chain reaction (**PCR**)

- **Monitoring:** Proviral load (**PVL**)

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Diagnostic algorithm



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- After infection with HTLV-1, Abs to core, env and tax proteins in serum appeared.
- Within 30-60 days after primary HTLV-1 infection, Ab to gag proteins predominant with anti-p24 generally appearing before anti-p19 antibodies.
- Antibody to p-21 env protein frequently appears before gp46 Abs.
- Anti tax Abs are the latest antibodies to appear in the time course of seroconversion.

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ELISA (Anti-HTLV-1&2)

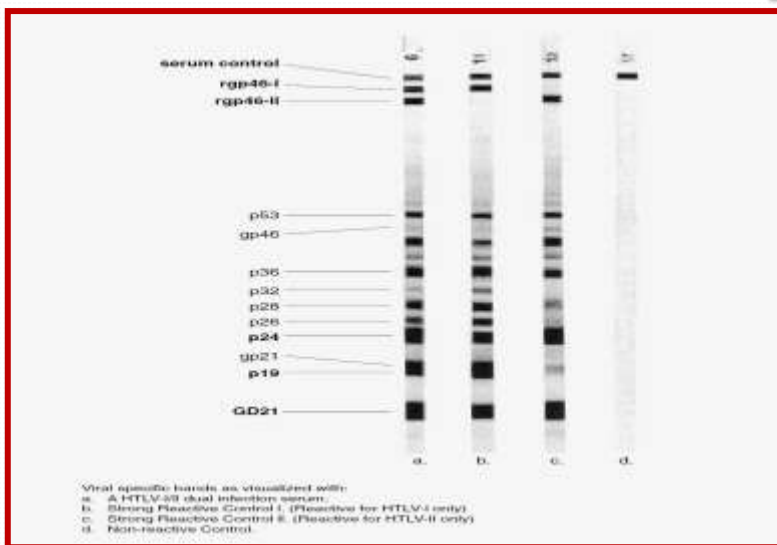
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WB test

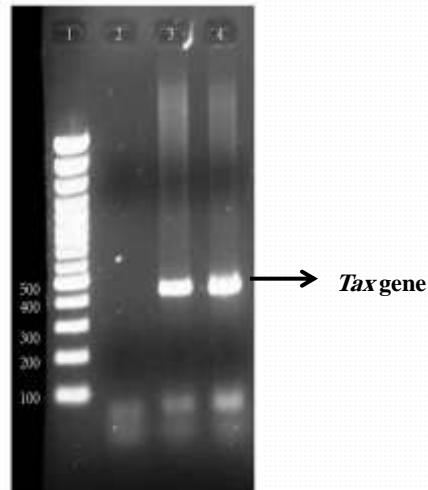
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HTLV-1 *Tax* PCR

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HTLV-1 proviral load

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- Detection Method

Quantitative Real-time PCR (TaqMan)

- Specimen

Peripheral Blood Mononuclear Blood Cells (PBMCs)

- The PVL of HTLV-1 usually reaches a **stable equilibrium “set point”** that fluctuates in most cases by no more than **2-4 fold** over a period of years.

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Comments



1. There aren't robust ranges for prognosis of clinical manifestation of HTLV-1 infected subjects.

- According to literatures the estimated ranges are:

HTLV-1 healthy carriers: 10-250 copies /10⁴ PBMCs

HAM/TSP patients: 200-500 copies/10⁴ PBMCs

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Comments



2. Quantitative Real-time PCR assay, TaqMan method, are the robust technology for viral load quantification and therapy monitoring. However, due to variation between different laboratories and quantification methods, to achieve more reliable results, the same laboratory should be used for the therapy monitoring of the **HTLV-1** infected patients.

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