



BIOMEDICINE
versus
TRADITIONAL MEDICINE
Therapy for HIV/AIDS

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BIOMEDICINE

Therapy for HIV/AIDS

Anti-Retroviral Therapy

- Highly active anti-retroviral therapy (**HAART**) is the current HIV/AIDS treatment modality
- Very effective in **suppressing HIV-1 replication** and reducing the mortality of HIV/AIDS patients
- The primary targets for anti-HIV-1 therapeutic development are two virally encoded enzymes: **Reverse Transcriptase (RT) and Protease (PR)**

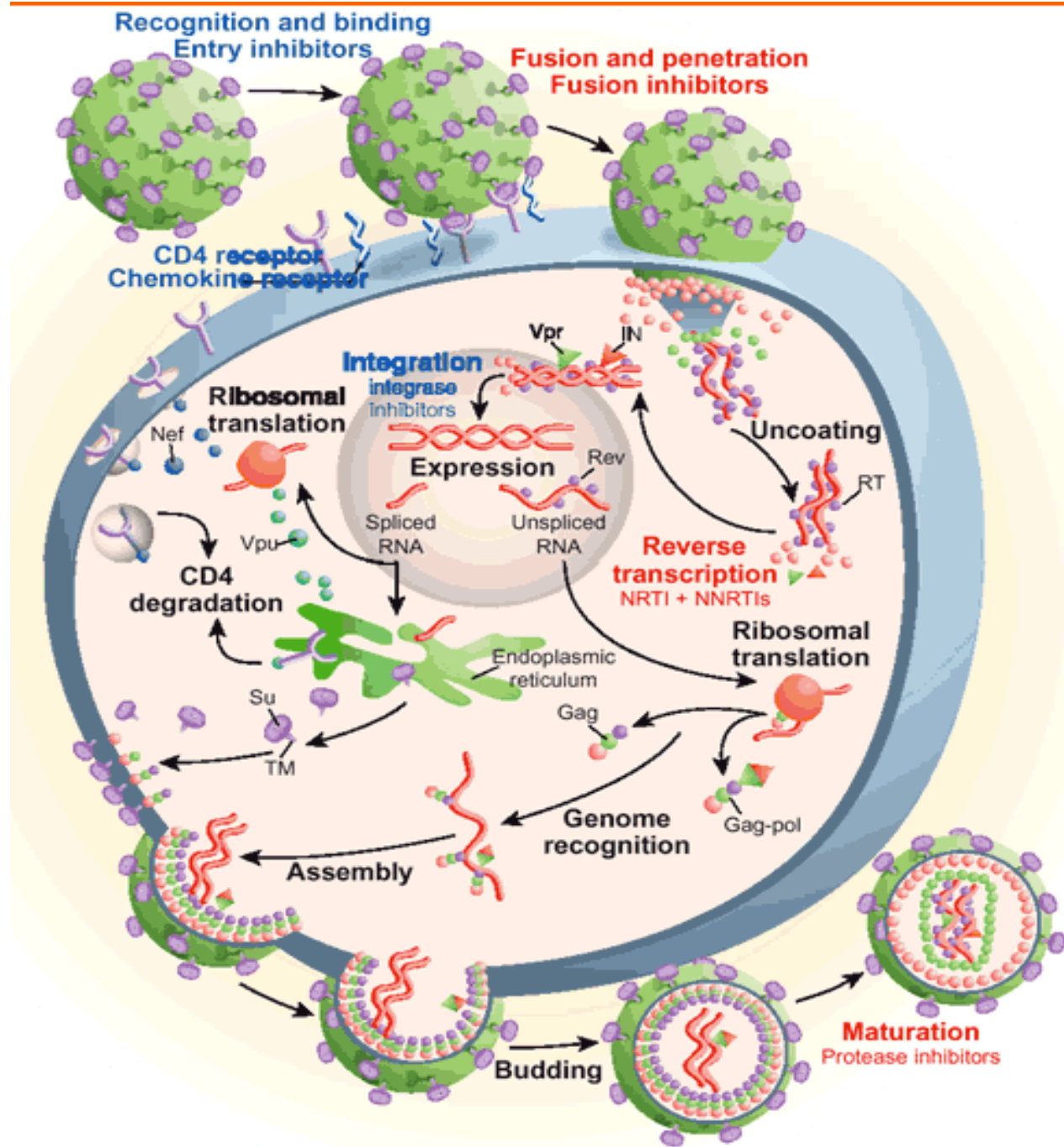


Image edited from www.medscape.com



- The Food and Drug Administration (FDA) has approved over 20 anti-HIV-1 drugs
 - majority are HIV-1 RT and PR inhibitors
- Various combinations of these inhibitors, so-called highly active anti-retroviral therapy (HAART)
 - potent, convenient and usually well tolerated
 - capable of reducing HIV blood concentration to undetectable values within a few weeks
 - inducing a robust and sustained CD4 T-cell gain

- However, the current treatments used are:
 - unable to eradicate HIV from infected individuals
 - therapy must be lifelong
 - potential for side effects
 - pathogenesis of unexpected systemic complications owing to chronic inflammation & immune dysfunction associated to HIV infection
 - life expectancy of people under ARV therapy remains lower with respect to that of uninfected people
 - high costs for health care system

Bigger Picture!

- Dis-homogenous pattern of HIV disease worldwide (70% of the burden in Africa!)
- Access to HIV diagnosis, treatment and care are seriously limited in the geographical areas that are most affected
- Undiagnosed and untreated population represents an infected reservoir that increases HIV transmission

TRADITIONAL THERAPEUTIC OPTIONS

Two Examples

CHINA (Basic Science)

TANZANIA (Social Science)

EAST ASIA

China



Relatively fewer anti-HIV-1 therapeutics have been developed to target other steps of HIV-1 life cycle including entry, fusion, and integration

(In-Woo Park et al. 2009)

- A panel of traditional Chinese medicinal herbal extracts obtained from plants in Hainan Island, China
- Extracts from Euphorbiaceae, *Trigonostema xyphophylloides* (TXE) and Dipterocarpaceae, *Vatica astrotricha* (VAD) both block HIV-1 replication at the entry step
- Potential of developing these plant extracts as anti-HIV-1 entry inhibitors

Extracts from the stem of TXE and the stem of VAD:

- **Inhibited HIV-1 replication** without apparent effects on cell proliferation and cell survival
- **Prevented HIV-infected cells from forming syncytia**
- Potently **blocked HIV-1 from entering** its target cells
- Had **little effects on post-entry HIV-1 gene expression**

- TXE and VAD extracts possess potent inhibitory activities against HIV-1 replication and entry of both **T and M tropic HIV-1 isolates**
- These results suggest that TXE and VAD are **potential biosources** for further identification and isolation of active anti-HIV-1 constituents
- Identification of these active constituents will help **establish the precise mechanisms** of this entry inhibition as well as **standardize** the extracts for potential clinical translation

SUB-SAHARAN AFRICA

Tanzania



As in most parts of Africa, traditional medicine remains a relatively untapped resource in the overall struggle against AIDS
(Kisangau D. et al. 2011)

- HIV/AIDS pandemic: currently the largest socio-economic challenge that faces Tanzania
- Traditional medicines are the most widely established and available health care system:
- > 60% of the population depends on traditional medicines
- The ratio of Medical Doctors to traditional healers in Tanzania is estimated at 1:350



Community Based Initiative

- Tanga AIDS Working Group (TAWG)
'Traditional Medical Island of Hope'
- **Build capacity** of traditional healers
- Provide effective **low cost** herbal remedies
- **Research** on promising herbs
- Ensure **sustainable supply** of medicinal plants
- Treated 4,500 AIDS patients with opportunistic infection; currently over 1300 patients

- Efforts are underway to scale up TAWG's experience to other parts of Tanzania and possibly other regions of Africa
- The World Bank Indigenous Knowledge for Development Program:
supported a community-to-community exchange of experiences between healers, people living with AIDS and staff working with patients with similar communities across the country.

Institution Based Initiative

- Gaps exist between THs and biomedical scientists in health research
- Recognition of THs as stipulated:
 - *National Health Policy, the Policy and Act of Traditional, complementary and alternative medicine*
- The priority institution:
 - *The Institute of Traditional Medicine (ITM), Started in 1974, Today – A Centre of Excellence!*

CONCLUSION

Leveraging traditional and modern knowledge systems to help combat HIV/AIDS

- HIV is now a chronic illness in patients with continued treatment access and excellent long-term adherence
- Huge efforts are ongoing to reproduce these results even in poor and disadvantaged settings
- All currently FDA-approved anti-HIV drugs are chemically synthesized

- Development involves an extremely long cycle of research, design and optimization, thus these drugs are very expensive
- Use is often limited by side- effects and non-adherence issues
- In contrast, medicines of natural origins such as herbs have a much short development cycle and relatively inexpensive

- Importantly, the toxicity of nature-derived medications is rarely an issue (mainly address opportunistic infections)
- There is need to further investigate and develop alternative anti-HIV therapy
 - *ultimately affordable and available to all HIV/AIDS- affected individuals including those in developing and under-developed countries*

RECOMMENDATIONS!

It is crucial to bridge the yawning gap
between traditional and modern health
sectors

- Community seminars should be conducted
 - Exchange knowledge around themes associated with HIV/AIDS to improve the skills and knowledge base of all concerned
- Sub-communities representing:
 - Traditional Healers
 - Care givers / Social Scientists
 - Medical Doctors / Research Scientists
 - People living with HIV or AIDS, PLWHA

- The Indigenous Knowledge Program has also helped incorporate the TAWG model into the World Bank supported **Multi-country HIV/AIDS Program for Africa (MAP)**
- In countries such as Guinea, Ghana, Ethiopia and Burundi, traditional healers are being incorporated into national AIDS programs that have a country wide impact

THANK YOU!

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