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Lecture 11: 4/15/08

Dr. Kalpana Gupta from IAVI
Challenges and New Approaches in the Quest for a Prophylactic HIV vaccine

International Aids Vaccine Initiative

33.2 million people currently infected with HIV; every minute there are 5 new infections.
Deliver for today:

- prevent further spread of virus
- treatment and care for those infected
- mitigate social impact

Develop better tools for future

- invest in tools necessary to end the epidemic (drugs, diagnostics, microbicides, vaccines)

Necessary investment is in the billions of dollars, and is much more than has yet been spent. A vaccine is critical for the affordability of this effort; also, vaccines *work* at ending epidemics (e.g. smallpox).

- A vaccine would also be the best women-controlled intervention; women around the world don't always have control over their own health or safe-sex practices.

Is an AIDS vaccine possible? Yes.

- Humans can control the virus, up to a point.
    - Rare human antibodies protect against HIV strains.
    - Majority of HIV infected people initially suppress viral load.
    - Some never contract HIV despite repeated exposure to virus; some become infected but don't develop AIDS.
- Experiments in animals provide valuable insights.

Goals for vaccine:
Primary: prevent establishment of HIV infections (block entry)
Secondary: control HIV infection and progression to AIDS (reduce viral load)
Tertiary (public health): reduce HIV transmission (reduce infectiousness)

A vaccine could have a significant impact: could avert 5.5 to 28 million new infections, according to projections.

Many challenges:

- Scientific:
    - HIV suppresses/destroys key immune system cells
    - Retrovirus; infection is forever
    - Natural immunity doesn't clear virus
    - Unmatched in virus variability

    - Traditional approaches are not feasible
    - Relevant animal models are lacking
    - Correlates of protection unknown (not unusual; chicken/egg problem)
    - Clinical trials are long and costly
- Policy:
    - Ethical concerns (high-risk cohorts; observations might be accused of "watching and waiting")
    - Health systems challenges
    - Market incentives for the industry are lacking
- Political:
    - Long-term challenge requires long-term global commitment

Why don't we have a vaccine today? Effort was sub-optimal and the science is tough. The global pipeline is and has been inadequate.

International AIDS vaccine initiative: the first PPPDP.

The neutralizing antibody challenge: formed the IAVI Neutralizing Antibody Consortium.

[The IAVI part of the presentation might be good for inspiring thought questions about how to improve the process. I should try to get my hands on the presentation, or just push to publish it.]

Questions for IAVI, and the world of global health in general:

- How can we get the most creative minds engaged?
- Are there other approaches we should be exploring?
- Are there other mechanisms we should be exploring?