ASSISTED REPRODUCTION WITH SPERM FROM HIV-INFECTED MEN

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Editor's corner

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Retroviruses and reproduction

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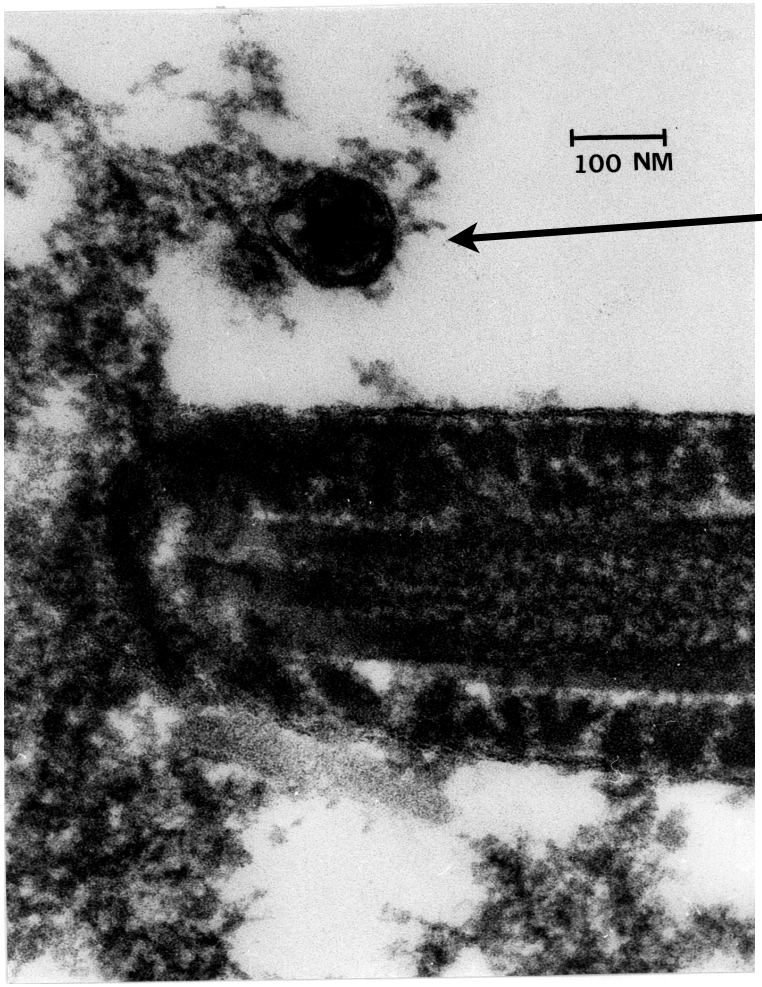
The venereal transmissibility of human immunosuppressive virus (HIV) and human T-cell leukemia virus, I (HTLV-I) impacts reproductive medicine in a number of ways. The possibility of HIV transmission by donor semen has received prompt and appropriate attention, with most centers using only cryopreserved semen stored according to quarantine guidelines for monitoring possible seroconversion of donors. As the incidence of HIV-positive pregnant women rises, obstetric units are evolving safeguards for medical staff attending deliveries. Counseling women at risk for HIV infections about the possible outcome to offspring is becoming increasingly necessary. Some centers for assisted reproductive technology require mandatory screening of patients for HIV antibody as a safeguard for their laboratory and medical staff.

However, a consequence of the venereal transmission of human retroviruses that has not received widespread attention is the impact on reproduction per se. That the impact will be a negative one is due to

1983:



Reported:
First Int'l Aids Congress, 1985;
AIDS 1:419, 1988

First electron micrograph of HIV in semen

The Need:

By 1987, 10,000 men and boys with hemophilia in the U. S. infected with HIV through clotting factors

Thousands of men and women infected by blood transfusion and IV drug abuse

1990: First Congress on "AIDS and Reproduction," Genoa, Italy
"Sperm washing" and IUI advocated by Augusto Semprini

1991: Centers for Disease Control: "IUI with sperm from HIV infected men not proven safe"

The Goal:

Develop methods to reduce, hopefully eliminate, transmission of HIV from infected male to uninfected female attempting pregnancy.

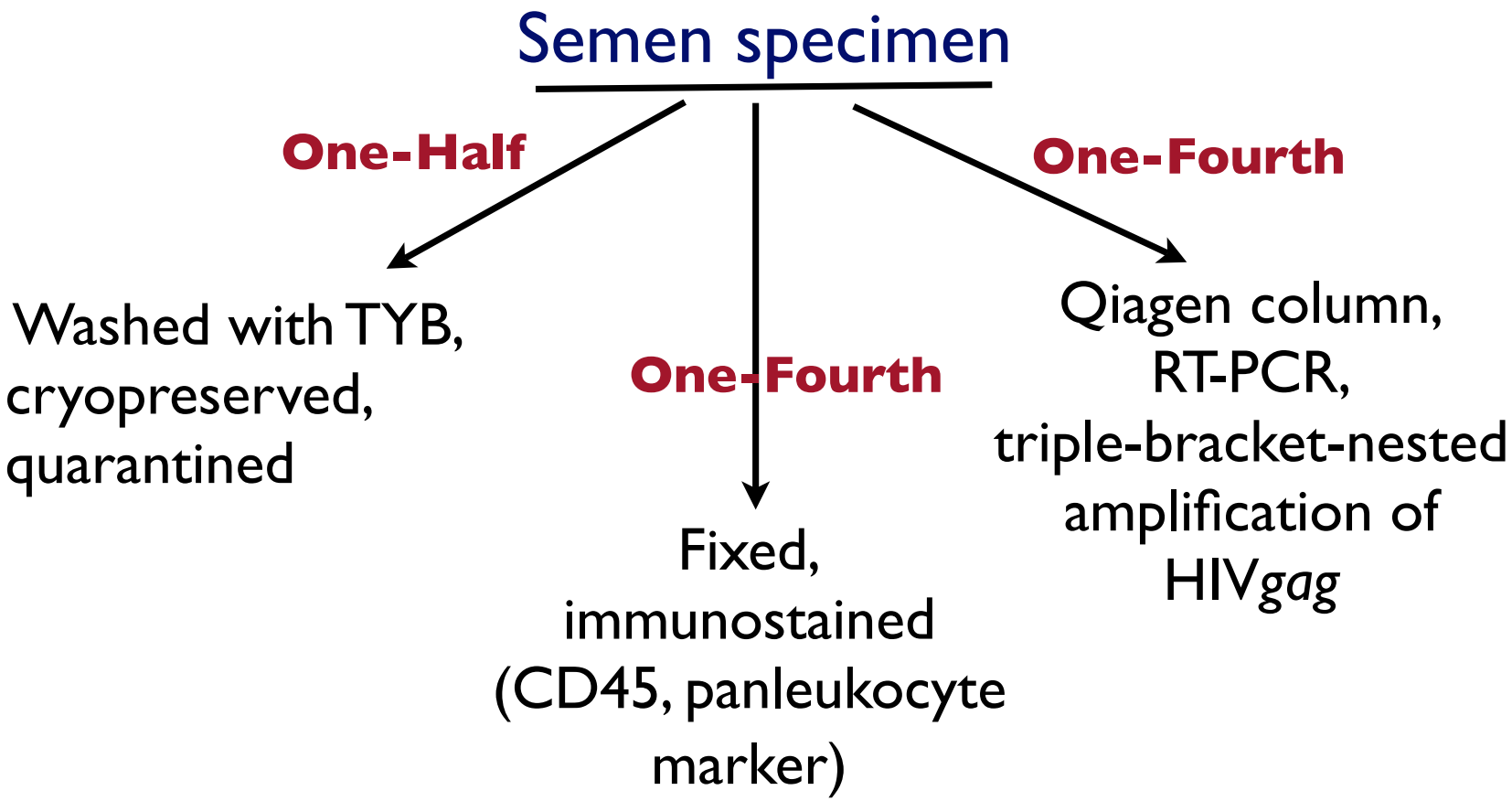
The Hope:

HIV infection in the male would be regarded as a form of male factor infertility

The Plan:

Develop sensitive assays for HIV and HIV-infected cells to eliminate the use of sperm from semen with detectable virus.

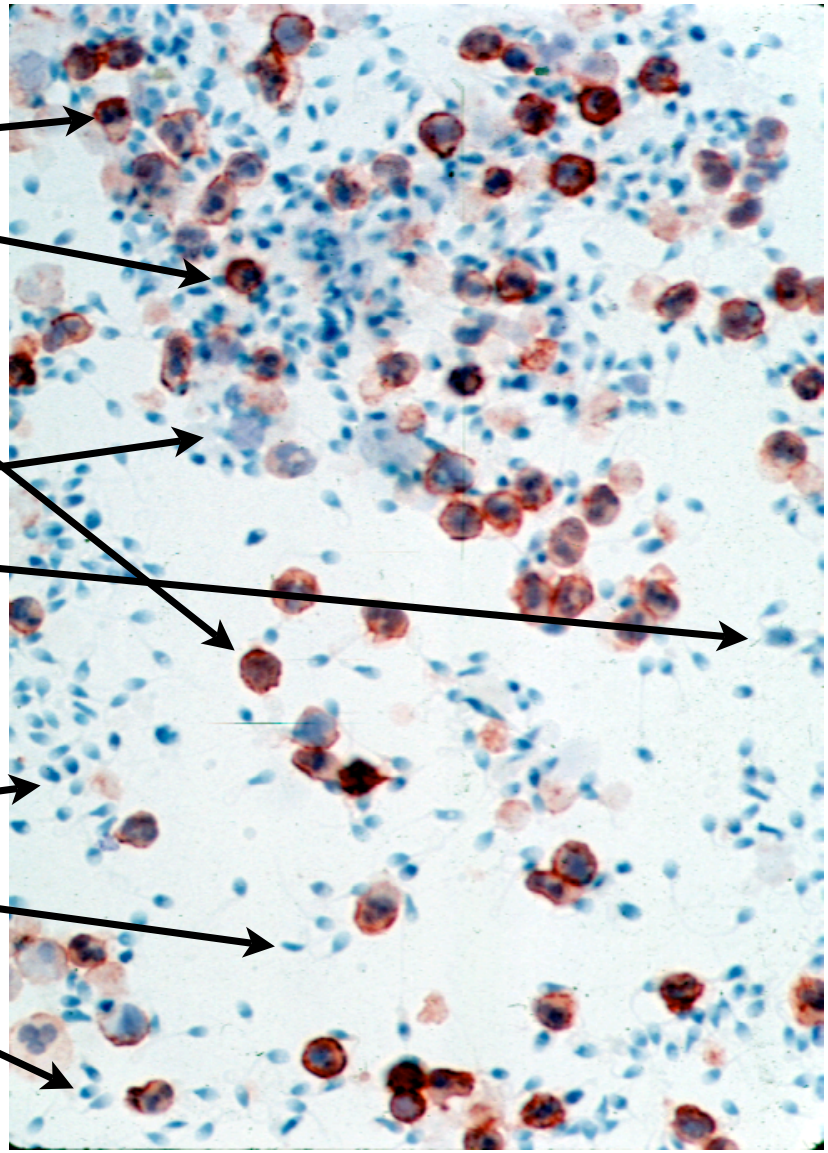
Semen HIV assays:



CD45+ leukocytes (red-brown)

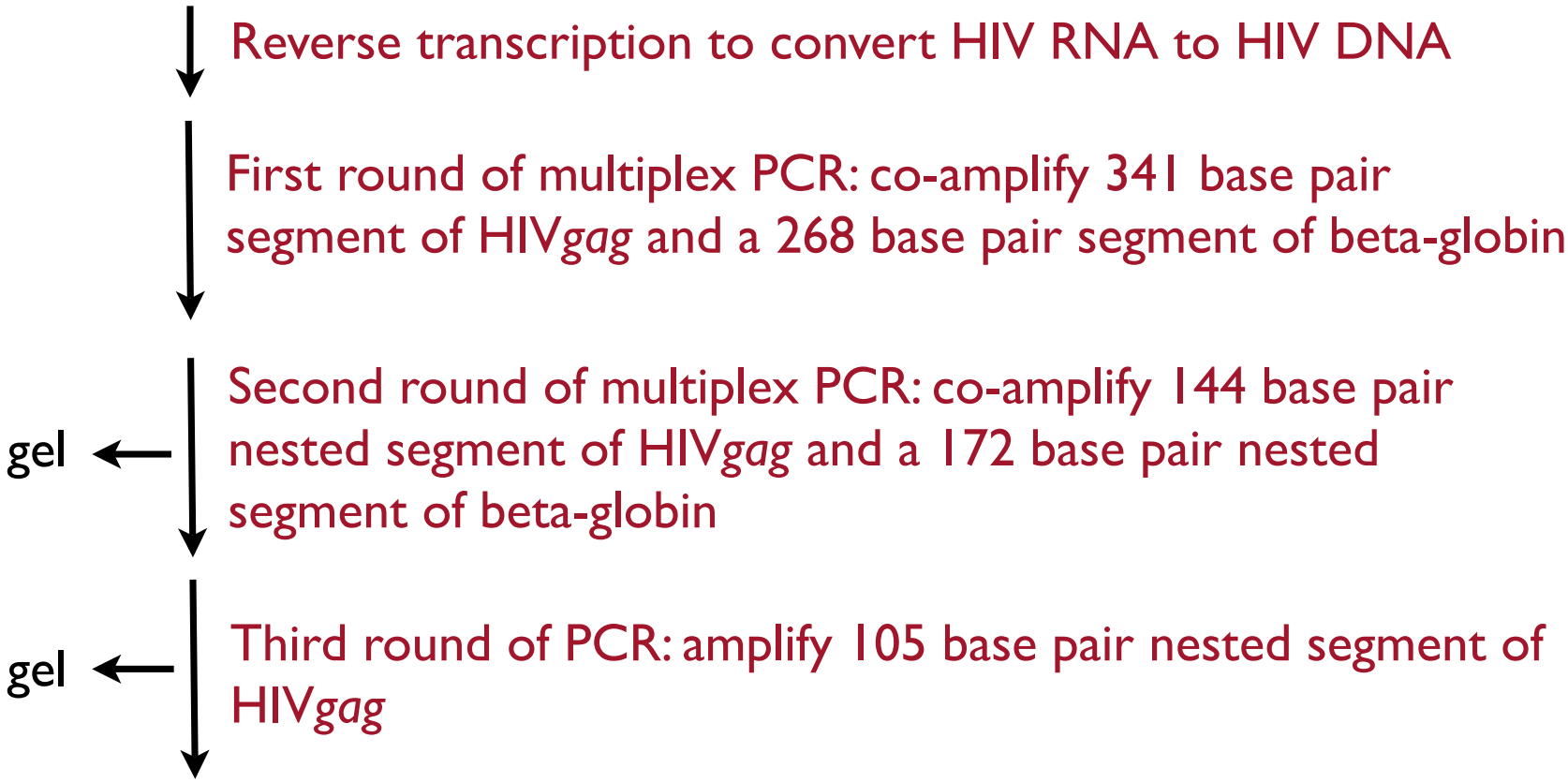
Immature germ cells (blue)

Mature sperm (dark blue)

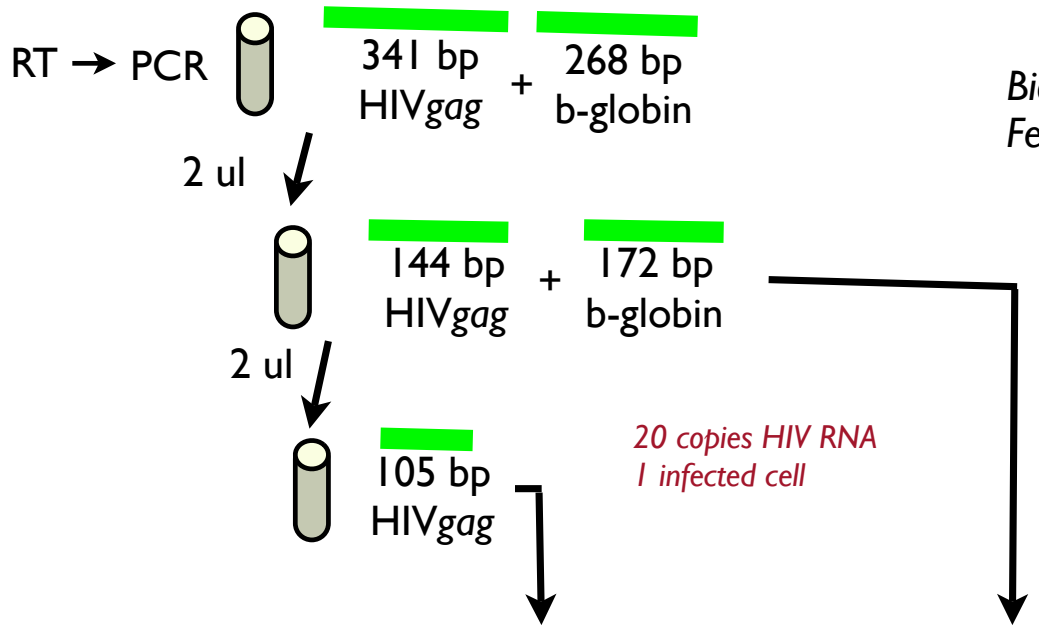


RT-PCR steps:

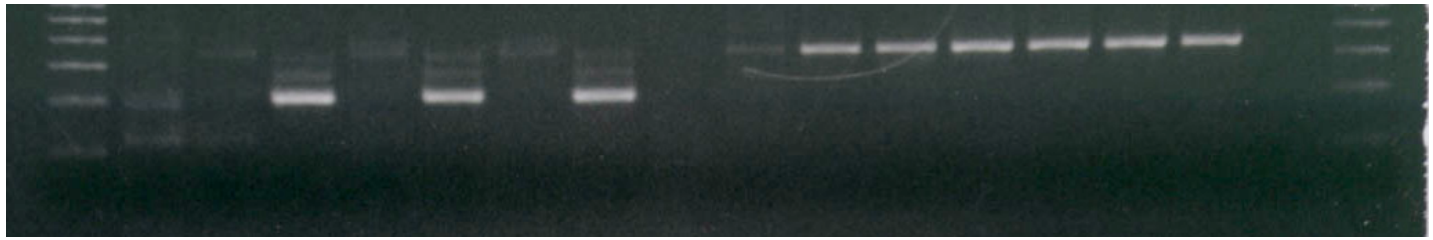
Semen cells and particles, but not sperm heads, lysed to release RNA and DNA:



RT-PCR steps:



Biotechniques 15: 128, 1993
Fertil Steril 60: 576, 1993



L 1 2 3 4 5 6 Pos Bl 1 2 3 4 5 6 Pos Bl L

HIV in sequential semen specimens:

Patient								
1	•		U		•	•		U
2	•	•			U		•	•
3	•		•		U		•	
4	•	•		•		•		U
5	•		U		U		•	
6	•		U		•			U
7	•		•		U			
8	U		U		U		•	U
9	•		U		U	•		
10	•		•	•		U		
11	•	U		•		U		
12	•		•		•			•
	1	2	3	4	5	6	7	8

Month of study

U = undetectable

• = HIV positive

Program steps:

Set up as a clinical trial; all couples treated uniformly until at least 100 births; then convene a workshop to alter as indicated

(1) Interview with HIV counselor

a) Health status of male:
regular visits to infectious disease specialist;
no "minimum" blood viral load;
explain complex nature of HIV in semen;

b) Health status of female:
at risk for HIV infection (and possibly Hep C/B);
need for fertility evaluation;
need for follow-up HIV antibody testing;

c) Fertility clinic referral, if needed

d) Need to test baby sometime during the first year

Program steps:

(2) Submit semen specimens for testing, using overnight transport kit if not in Boston area

(3) Sperm from half of specimen is cryopreserved, remainder of specimen is tested for leukocytes, HIV virus, and HIV-infected cells

(4) If HIV detected, sperm discarded; fresh specimen is tested

(5) If two specimens in a row test positive for HIV, man may be referred to urologist, if suspect GU tract infection; or to infectious disease physician if adjustment to antiviral therapy is indicated.

Program steps:

(6) Cryopreserved sperm from two specimens with un-detectable viral burden stored until shipped to collaborating fertility treatment center

(7) Pregnancy attempted by IVF or oligospermia cup (NOT IUI)

(8) Female partner tested for HIV antibody at 3 weeks, 3 months and 6 months after pregnancy attempt -- whether or not pregnancy achieved

(9) Baby tested for HIV antibody within first year of life

Program began in 1996

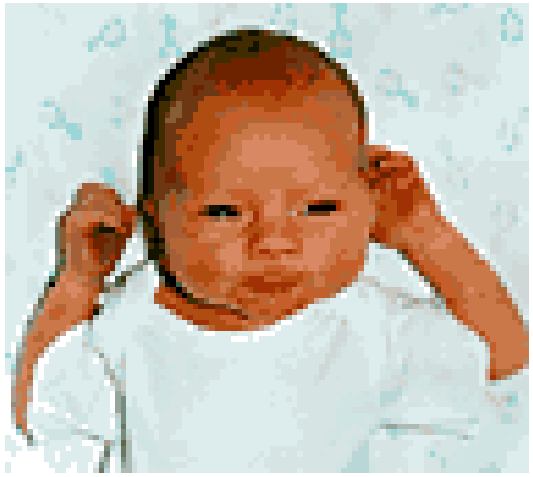
Controversial, caught in hospital merger, relegated to a public charity

First baby born in 1998

(Stephen Smith, "*Fertility Race*," Minnesota Public Radio)

Conceiving Ryan

by Stephen Smith of Americanradioworks
Minnessota Public Radio



2000-2006:

608 semen specimens from 262 men tested for HIV

107 (19%) semen specimens tested positive, discarded

151 couples proceeded to ART

69 pregnancies, 62 babies born, 10 sets of twins

As of September, 2007:

26 collaborating fertility clinics

71 Babies born, 8 ongoing pregnancies

All Moms and Babies test negative for HIV

Future Plans:

Seek FDA/CDC approval for semen testing protocol

Seek insurance recognition of HIV infection as male factor infertility

Correlate data, not an "infertile" population

Provide semen test for Hep C/B

FUNDING NEEDED

To help, or for information:

lab@bedfordresearch.org

(all inquiries strictly confidential)