

# A Game of T Cells: Using Cancer Tumor Cell Technology to Cure HIV



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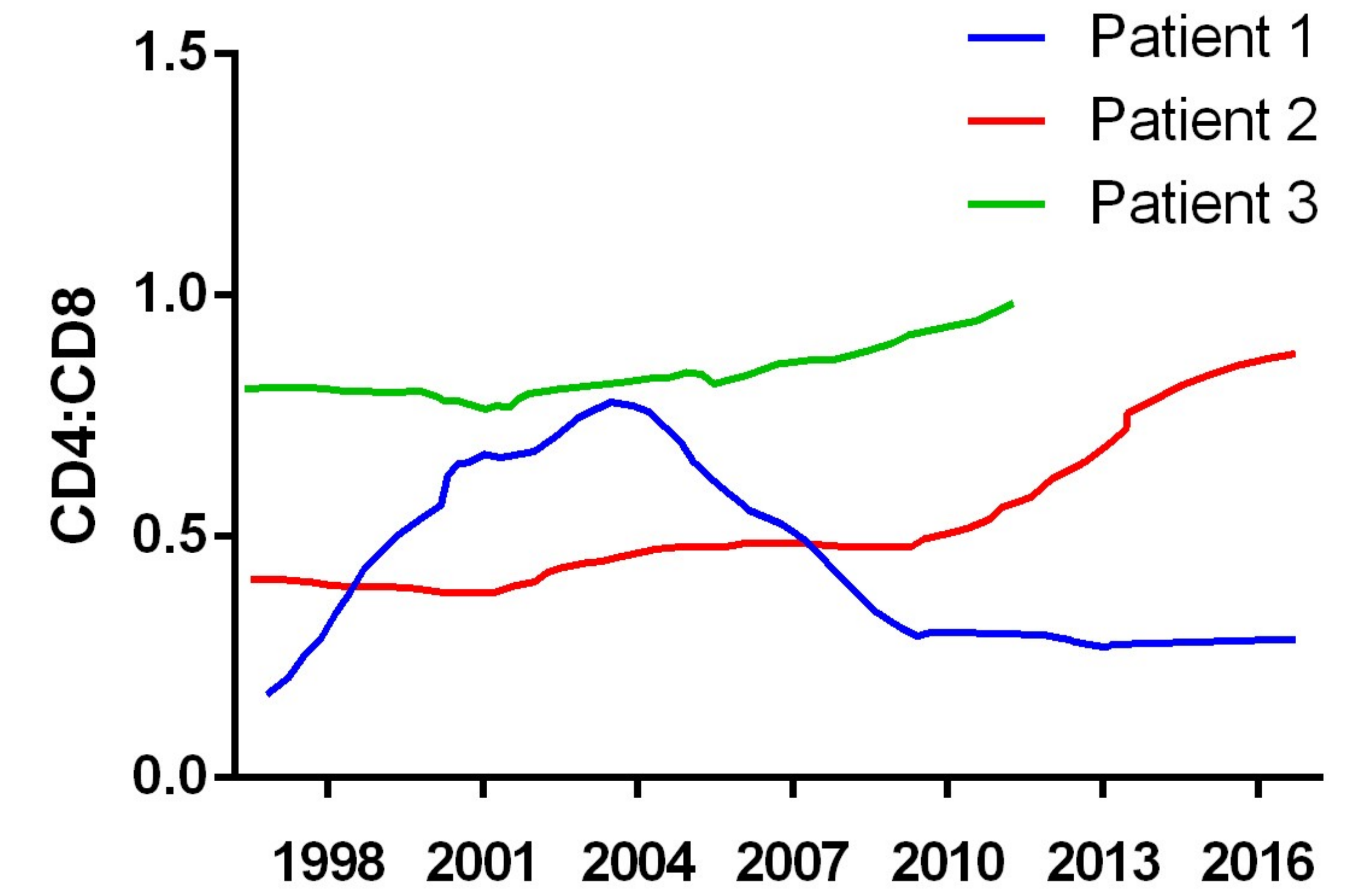
## Preface



Songs and legends spoke of a virus capable of wiping out much of human civilization. A few decades ago, this virus, HIV, emerged from the depths and began its attack. To this day, the battle continues as researchers, doctors and families across the world fight on against this evil.

But recently, a new song was discovered, as a team of researchers uncovered a way to detect this latent virus. By counting the CD4 T-cells in the body using technology to detect circulating tumor cells, the researchers were sure they had found the answer they were looking for<sup>1</sup>. But this song was found to only be partially true, for another group of researchers discovered that this song was incomplete<sup>2</sup>.

Now the race is on to complete discover the missing verses, and understand everything there is about HIV.

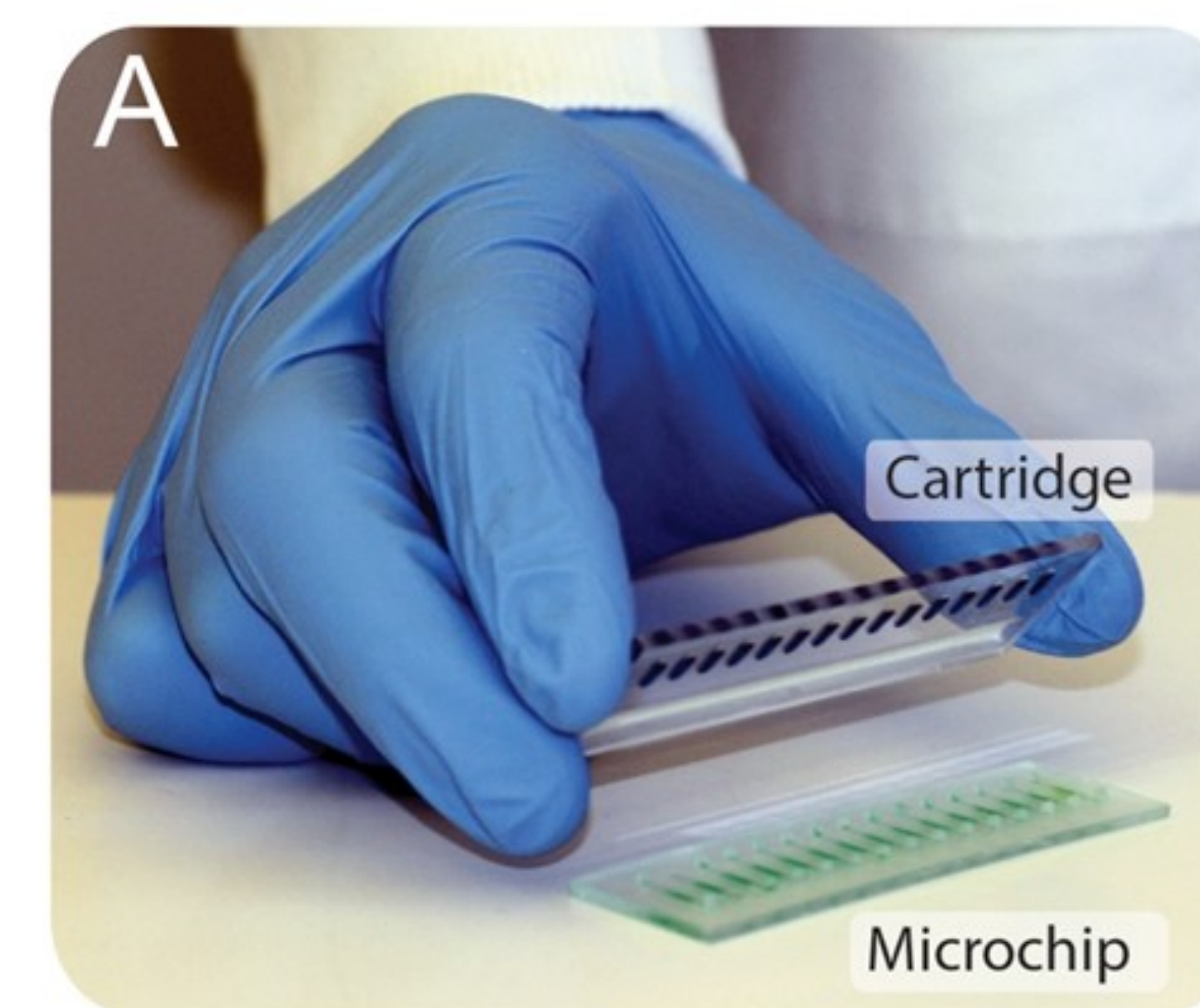


CD4 T-cell: a white blood cell that warns the body that there is a problem

CD8 T-cell: a white blood cell that will destroy damaged cells

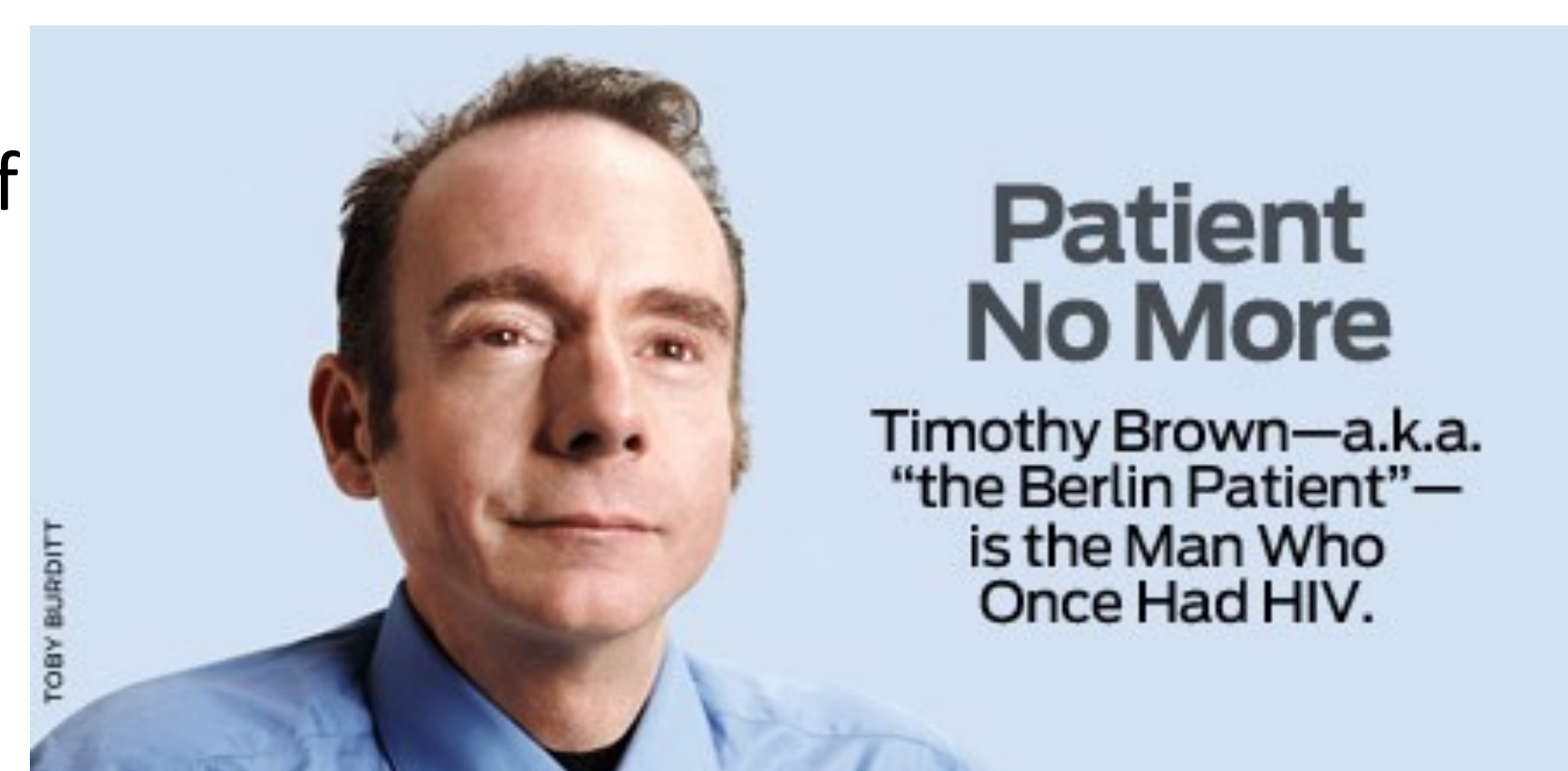
## Alliances Form

- . UW
  - . Differences in ratios between males and females
  - . Easy to obtain samples for assay development
- . VA
  - . Vast wealth of ratio records
  - . Does curing Hepatitis C improve ratio?
- . Ethiopia
  - . Clinical effects of low ratio (cervical cancer cases)
  - . Differences between male and female ratios
  - . Does Tuberculosis co-infection alter the ratio?



## Heroes Arise

- . Antiretroviral therapy (ART) acts as a wall, protecting the body from attacking virus (whitewalkers)
- . Like Jon Snow, Tim Brown has managed to rid himself of HIV (death of a whitewalker)
- . A group of researchers (Maesters) have deciphered another verse and have modeled some dynamics of HIV with and without ART<sup>3</sup>.



## References:

1. Pantaleo G, Graziosi C, Fauci AS. New concepts in the immunopathogenesis of human immunodeficiency virus infection. *N Engl J Med*. 1993; 328: 327-335.
2. Rodríguez B, Sethi A, Cheruvu V, Mackay W, Bosch R, Kitahata M, Boswell S, Mathews WC, Bangsberg D, Martin J, Whalen C, Sieg S, Yadavalli S, Deeks S, Lederman M. Predictive Value of Plasma HIV RNA Levelson Rate of CD4 T-Cell Decline in Untreated HIV Infection. 2006. *JAMA* 296(12): 1498-1506.
3. Reeves D, Duke E, Prlic M, Hladik F, Schiffer J. A compound interest approach to HIV cure. *BioRxiv*. 2016.
4. Berry S, Pezzi H, Williams E, Loeb J, Guckenberger D, Lavanway A, Puchalski A, Kityo C, Mugenyi P, Graziano F, Beebe D. Using Exclusion-Based Sample Preparation

## A Wealth of Knowledge

- . 300 of the above curves from our VA
- . We expect to learn from ~3,000 similar curves from VISN-12 (our section of the VA)
- . Access to 30,000 curves from patient data across the country

## Spoilers Ahead...

- . Anti-proliferative drugs (Children of the forest) vs. Shock-and-Kill (NIH wights)
- . Reservoir Assays (New Tones): ESP-TILDA vs KOALA-QVOA<sup>4</sup>
- . Once the blood reservoir disappears, how long until the antibody bends the knee as well?
- . Will the ratio parallel the reservoir?...