Docket #: S25-358

Development of a Potent, Broadly Neutralizing Bispecific Antibody Against HIV-1

HIV-1 infection destroys CD4+ T cells and can lead to acquired immunodeficiency syndrome (AIDS). While mother-to-child transmission has been dramatically reduced through effective public health interventions, an ongoing epidemic of pediatric HIV-1 infection persists, with an estimated 150,000 new pediatric infections occurring globally each year.

The Kim lab at Stanford has invented a bispecific antibody designed to target and bind to HIV-1 co-receptors. The antibody prepositions an N-heptad repeat (NHR)-targeting antibody at the site of viral entry by binding to the HIV-1 co-receptor CCR5, dramatically improves neutralization compared with NHR binding alone. This approach achieves complete neutralization breadth against a large panel of HIV-1 strains, making the invention the most broadly neutralizing engineered HIV-1 antibody reported to date. These findings support the potential of this strategy as an effective HIV-1 inhibitor and reinforce the concept of targeting the NHR as a viable prophylactic approach, particularly in the case of reducing mother-to-child transmission.

Stage of Development
Research - in vitro

Applications

- Individuals with HIV-1 or at a high risk of HIV-1 infection

Advantages

- Most broadly neutralizing engineered HIV-1 antibody available
- Could be safely administered to pregnant women and infants

Publications

- S. Kim,K.A. Travisano,B. Wilder,M. Palomares,Z. Cao,M.S. Seaman, & P.S. Kim (2025). Exceptionally broad HIV-1 neutralization via bispecific antibody–mediated prepositioning. *Proc. Natl. Acad. Sci.* U.S.A. 122 (40) e2517311122.

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