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Multi-specific antibodies to target HIV-1 virus strains

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The bi-NAb neutralized 95% of the circulating HIV-1 viruses, which is superior to any single agent



A team of researchers at IBBR, led by Dr. Yuxing Li, Associate Professor at the University Of Maryland School Of Medicine, Baltimore, and Principal Investigator at the Institute for Bioscience and Biotechnology Research (IBBR), Rockville, is showing how engineered multi-specific antibodies appear to be highly effective at preventing infection across a broad range of HIV-1 virus strains.

Effective treatment of HIV infection currently involves using combinations of antiretroviral drugs (ARV).

While ARV treatment can improve the overall quality of life of HIV-positive individuals, better alternative treatments are needed since they can cause undesirable side effects and patients can become resistant to ARV therapy.

Immunotherapeutics, molecules derived from the immune system, can be used to specifically target and neutralize HIV-1 virus particles.

Several of these broadly neutralizing antibodies (bNAbs) are being developed and preliminary trials indicate that these individual bNAbs are safe, well-tolerated, and can reduce HIV-1 infection early on.

However, treatment is not associated with long-term reductions in virus levels and, due to HIV's ability to rapidly mutate, resistant strains can emerge. Additionally, the risk of transmission still exists.

Dr. Li's laboratory successfully created a bispecific antibody (bi-NAb) combining two bNAbs and tested it on a panel of 208 strains of HIV virus that are prevalent in humans.

The bi-NAb neutralized 95% of the circulating HIV-1 viruses, which is superior to any single agent.

"We further improved antiviral potency by engineering a tri-NAb and found that it can inhibit 99.5% of circulating HIV-1 viruses." said Dr. Li.

This technology could lead to development of the broadest-spectrum anti-HIV-1 immunotherapeutic and preventive treatment that exist worldwide.

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