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Scientists create new tool for identifying powerful HIV antibodies

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A team of NIH scientists has developed a new tool to identify broadly neutralizing antibodies (bNAbs) capable of preventing infection by the majority of HIV strains found around the globe, an advance that could help speed HIV vaccine research.

Scientists have long studied HIV-infected individuals whose blood shows powerful neutralization activity because understanding how HIV bNAbs develop and attack the virus can yield clues for HIV vaccine design. But until now, available methods for analyzing blood samples did not easily yield specific information about the HIV bNAbs present or the parts of the virus they targeted. In addition, determining where and how HIV bNAbs bind to the virus has been a laborious process involving several complicated techniques and relatively large quantities of blood from individual donors.

The new tool lets scientists determine precisely the HIV bNAbs present in a particular blood sample by analyzing the neutralized HIV strains there. Called neutralization fingerprinting, the tool is a mathematical algorithm (a problem-solving procedure) that exploits the large body of data on HIV bNAbs generated in recent years. The neutralization fingerprint of an HIV antibody is a measurement of which virus strains it can block and with what intensity. Antibodies that target the same portion of the virus tend to have similar fingerprints.

Blood samples contain mixtures of antibodies, so the new algorithm calculates the specific types of HIV bNAbs present and the proportion

of each by comparing the blood's neutralization data with the fingerprints of known HIV bNAbs. This approach is particularly useful when other methods of determining bNAbs targets in a blood sample are not feasible, such as when just a small amount of blood is available. Neutralization fingerprinting also is significantly faster than older analytic methods. According to the researchers who developed the assay, the underlying approach could be applied to the study of human responses to other pathogens, such as influenza and hepatitis C viruses, for which scientists have much information about neutralizing antibodies .

More information: I. Georgiev et al. Delineating antibody recognition in polyclonal sera from patterns of HIV-1 isolate neutralization. *Science* DOI: 10.1126/science.1233989 (2013).

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