

STEPS TOWARDS AN HIV VACCINE – B CELLS AND ANTIBODIES

B cells are white blood cells, which can make specific proteins (known as antibodies) to fight a virus. Neutralizing antibodies are like soldiers- they can very effectively prevent invasion of a cell by a virus.

The function of antibodies is to precisely fit on the outside of a pathogen (disease causing germ) or foreign matter, so that the immune system can recognize and eliminate the germ quickly. Unfortunately, in most HIV-infected patients, HIV mutations enable the virus to evade recognition by antibodies, which are produced by B cells. Therefore, in most cases of HIV infection, antibodies are not neutralizing and cannot stop virus infection. Research is underway to understand how, in rare cases, B cells produce neutralizing antibodies, which can stop cell infection by most strains of HIV. This may lead to an HIV vaccine.

It is thought that the reason most antibodies against HIV are ineffective is that B cells, the antibody factories, are themselves defective. By looking at defects in B cells during HIV infection, we might be able to boost the production of effective, neutralizing antibodies in HIV positive patients. Research to understand the lack of antibody (and by extension B cell) control of the virus could help us on a path to develop a successful HIV vaccine or combat the poor antibody responses against the virus.



South Africa's estimated HIV infection tally – 6.19 million in 2015 – is the highest in the world. 3 million new infections are occurring each year. Yet there is still no vaccine to stimulate the production of antibodies effective against HIV.

Why not?

B cells secrete antibodies – proteins that bind to a specific antigen on the surface of a pathogen such as a virus. Even though HIV does not directly infect B cells, the B cells in HIV patients are defective in their production of antibodies effective against HIV.

HIV can mutate rapidly, resulting in mutant

viruses that are not recognized by B cells. However, a small group of HIV patients, known as 'elite controllers', have been identified as being able to make antibodies potent enough to neutralize HIV mutants.

In view of this, a promising vaccination strategy could rely on the production of antibodies by such B cells to provide effective protection to a larger population infected with HIV. Therefore, understanding how the B cells of elite controllers can keep pace with the virus mutation rate in producing effective antibodies may help in the race to develop a vaccine against HIV.

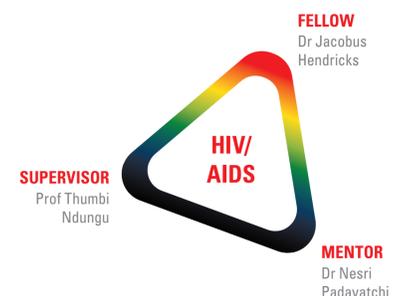


Towards Research Leadership

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