## Towards Decoding the Shield of Human Immunodefficiency Viruses (HIV)



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## Human Immunodeficiency Viruses (HIV)

Statistics



U.S. Federal Funding for HIV/AIDS, 2019 (in US\$ billions)

Antiretroviral Therapy prevents the growth of the virus, but do not kill or cure the virus.

### How does immune system work?



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Antibody has to recognize the <u>3D structure</u> of virus antigen.

### Why is it very challenging for immune system to combat HIV viruses?



Bjorkman, Acta Cryst. 2017

### Why is it very challenging for immune system to combat HIV viruses?



After mutation: Antibody fails to recognize the 3D structure of Env.

### How to develop an antibody-based vaccine against HIV?



with "glycan shield" (blue, violet dots)

# Characterize the exact 3D structure of Env protein: requires a <u>novel analytical method</u>.

### Tandem-Trapped Ion Mobility Spectrometry (Tandem-TIMS)



### How does Tandem-TIMS work?





+ glycoproteins implicated in other major diseases

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## Thank you for your attention