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Structural studies of the dynamic host-pathogen interaction underlying HIV infection

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Cluster of differentiation 4 (CD4) plays an important role in the adaptive immune response. CD4 is also the primary receptor for the HIV-1 envelope glycoprotein 120 (gp120). CD4 contains a metastable disulphide bond in its second domain which enables this protein's redox activity. CD4 binds the gp120 component of the viral envelope protein in a partially reduced state as shown by biochemical analyses carried out at the HIV Pathogenesis Research Unit (HPRU) at the University of the Witwatersrand, South Africa.

A collaboration exists between the ILL, ESRF and HPRU to use high and low resolution X-ray and neutron scattering techniques to determine the local and global conformational changes of CD4 as a result of its redox state and how this impacts its ability to bind gp120. We predict that this data will result in previously uncharacterised structural realignment within the CD4 protein which will aid in rational design of anti-CD4 directed immunogens for HIV-1 vaccination development.

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