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OTHER PROGRAM AFFILIATIONS



Cancer

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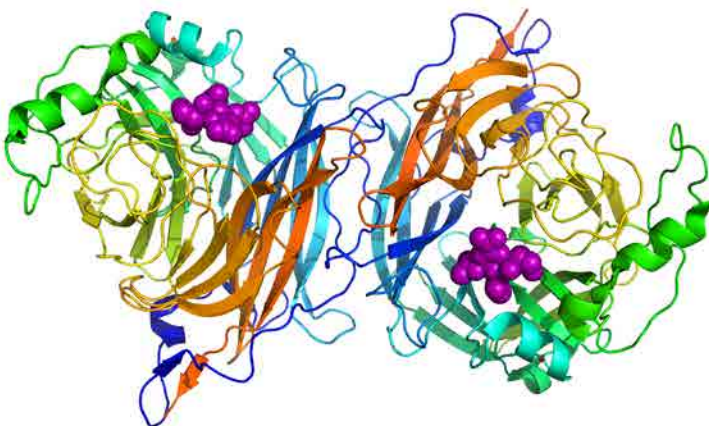
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Viral infection is a significant cause of global mortality and economic burden. Did you know the Spanish influenza outbreak of 1918 killed more than 40 million people? Or that hepatitis B is the most common infectious disease in the world, causing 600,000 deaths each year? The success of a virus is partly determined by how well it can evade the host innate immune response. Well-known RNA viruses like influenza A and the Hendra virus implement immune evasion strategies. Unfortunately however, these immune evasion mechanisms are often poorly understood and hampered by our limited understanding of how anti-viral immunity is activated by innate immune receptors such RIG-I. We use X-ray crystallography combined with in vitro and in vivo functional assays to understand 1) how anti-viral immunity is coordinated by host-proteins 2) viral immune evasion mechanisms. This information will enable us to devise new ways to combat viral infection. Our studies also have indirect impacts for cancer research as some of our targets are implicated in cell cycle regulation and tumor growth.

Research Projects

1. Understanding anti-viral immunity
2. Viral immune evasion mechanisms



The crystal structure of the parainfluenza virus type III haemagglutinin-neuraminidase protein bound to the drug Relenza (shown in purple)

Selected significant publications:

1. Atkinson SC, Armistead JS, Mathias DK, Sandeu MM, Tao D, Borhani-Dizaji N, Tarimo BB, Morlais I, Dinglasan RR*, **Borg NA***. 2015. The *Anopheles*-midgut APN1 structure reveals a new malaria transmission-blocking vaccine epitope. *Nature Structural and Molecular Biology*. 22 (7), 532-539.
2. Kass I, Buckle AM*, **Borg NA***. 2014. Understanding the structural dynamics of TCR-pMHC interactions. *Trends in Immunology*. 35 (12), 604-612.
3. Mathias D, Pastrana-Mena R, Ranucci E, Ferruti P, Ortega C, Staples GO, Zaia J, Takashima E, Tsuboi T, **Borg NA**, Verotta L, Dinglasan RR. 2013. A small molecule glycosaminoglycan mimetic blocks *Plasmodium* invasion of the mosquito midgut. *PLOS Pathogens*. 9 (11):e1003757
4. Reboul CF, Meyer GR, Porebski B, **Borg NA***, Buckle AM*. 2012. Epitope Flexibility and Dynamic Footprint Revealed by Molecular Dynamics of a pMHC-TCR Complex. *PLoS Computational Biology*. 8 (3):e1002404
5. **Borg NA**, Wun KS, Kjer-Nielsen L, Wilce MC, Pellicci DG, Koh R, Besra GS, Bharadwaj M, Godfrey DI, McCluskey J, Rossjohn J. 2007. CD1d-lipid-antigen recognition by the semi-invariant NKT T cell receptor. *Nature*. 448 (7149), 44-49.

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