

Single domain antibodies to probe the antiviral function of interferon-induced MX1 proteins

Content

For centuries, our immune system has been trapped in an evolutionary arms race with viruses. This relationship has shaped our immune defenses and led to the evolution of several specialized anti-viral proteins. An example of these are the Mx proteins: large GTPases that are part of the antiviral response induced by type I and III interferons, and thus belong to the first line of defense against viral infections. Despite the importance of these proteins, little is known about their anti-influenza activity. Therefore, we aim to elucidate the interactions between human and mouse Mx proteins and influenza vRNPs by using single domain antibodies (VHHs) as tools.

We have identified 20 VHHs directed against human MxA and 20 against mouse Mx1. These VHHs have been purified from the culture medium of *Pichia pastoris* transformants and are currently being characterized in vitro for their capacity to interfere with the GTPase activity of MxA and Mx1. Co-transfection of several of the MxA-specific VHHs with MxA results in an increase of the percentage of infected cells after infection with Influenza A SC35M (H7N7). Other MxA VHHs seem to decrease the percentage of infected cells and yet another set of VHHs appear to have no effect.

In the near future, we also aim to visualize the interaction between Mx proteins and IAV by high resolution microscopy techniques, using directly labeled VHHs as imaging tools. Overall, our findings may lead to novel insights in the mechanism of IAV restriction of human and murine Mx proteins.

Choose primary session

Virus host cell interaction

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Innate Immunity

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