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Cross reactive responses between filovirus species amongst a cohort of Ebolavirus Zaire survivors in Guinea, West Africa

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Purpose:

New and emerging filoviruses such as Ebola and Marburgvirus pose a major risk to public health as demonstrated by recent outbreaks across West and Central Africa. Amongst a cohort of Ebolavirus disease survivors in Guinea, West Africa we examined the cross-reactive response to Ebolavirus Sudan and Marburgvirus glycoproteins.

Methods:

We used an in-house anti-glycoprotein ELISA and pseudovirus neutralisation assays to investigate the cross-reactive serological response. Additionally, we used IFN γ ELISpot and memory B cell phenotyping to examine the cross-reactive cellular response augmented by T and B cells.

Results:

We assayed 40 serum or peripheral blood mononuclear cell (PBMC) samples from Ebolavirus disease survivors, who contracted Ebolavirus Zaire in 2015. Samples were collected in 2024 and it was found that at the humoral level all survivors showed a response to Ebolavirus Zaire glycoprotein, whereas 75% (30/40) showed a cross-reactive response to Sudan Ebolavirus and 40% (16/40) showed a cross-reactive response to Marburgvirus, however the magnitude of these responses varied. At the cellular level we found that 70% (28/40) showed a T cell response to Ebolavirus Zaire glycoprotein peptides, whereas 10% (4/40) and 0% (0/40) showed a T cell response to Ebolavirus Sudan or Marburgvirus glycoprotein peptides respectively. Using Ebolavirus species specific fluorescently conjugated glycoprotein we were able to identify Marburgvirus or Ebolavirus Sudan cross-reactive memory B cells and show that these are primarily activated memory, memory or atypical memory B cells.

Conclusion:

We conclude that the natural immune response to Ebolavirus Zaire leads to the generation of detectable immunity across the species. It is unknown what level of protection, if any, these cross-reactive responses will provide. However, these cross-reactive responses will provide the foundations for any future immune response

across the filovirus family. The identification of cross-reactive memory B cells could have implications for the identification of broadly reactive B cell clones that could be used to design therapeutics.