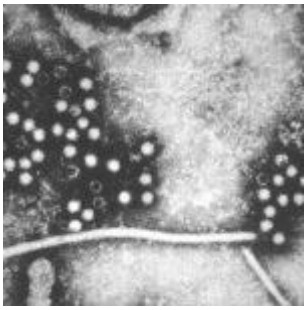
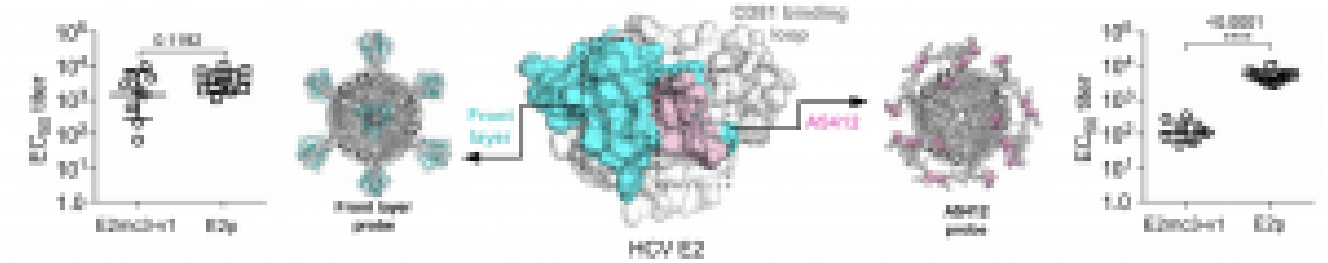
World Hepatitis Day: proof of concept HCV nanoparticle vaccine



Hepatitis is an inflammatory disease that affects the liver commonly caused by infection iwht hepatitis virus A, B, C, D or E. Viral hepatitis infection is a major global threat with approximately 350 million individuals with chronic hepatitis caused by either Hepatitis B (HBV) or C virus (HCV). Hepatitis is such a major problem that there is a dedicated World Hepatitis awareness day on the 28th July. Fortunately, there is a vaccine against HAV and HBV which are very effective. There is one vaccine against hepatitis E virus that has been approved for use in China but is not available in other countries. Hepatitis D virus (HDV) infection requires co-infection with HBV to facilitate viral replication, accordingly, HBV vaccination can also prevent HDV infection. Unfortunately, no vaccine against HCV is available yet In this article we highlight a recent research study by He et al., *Proof of concept for rational design of hepatitis C virus E2 core nanoparticle vaccines* published last year.

HCV is a very genetically diverse including *six major genotypes and more than 86 subtypes,* additionally, HCV has a rapid mutation of HCV leads to viral quasispecies that can escape the immune response in infected individuals. This makes developing HCV vaccines very challenging. HCV uses envelope glycoproteins E and E2 to enter human cells, of these two

proteins E2 is a major target for naturally induced neutralising antibodies (nAbs)that prevent HCV binding to CD81 (human protein). In this study by He et al., demonstrated that stabilising of E2 protein in a putative HCV- E2 nanoparticle vaccine induced "*elicited more effective nAb responses than soluble E2 cores. Next-generation sequencing (NGS) defined distinct B cell patterns associated with nanoparticle-induced antibody responses, which target the conserved neutralizing epitopes on E2 and cross-neutralize HCV genotypes*."



Epitope mapping of polyclonal antibody sera from groups 1 and 3 in study #1. Surface model of E2ECTO is shown in the middle with the FL and AS412 colored in cyan and pink, respectively. Statistical analysis of EC50 titers (fold of dilution) of groups 1 and 3 against the FL probe (left) and the AS412 probe (right). Structural models of the designed nanoparticle probes are placed next to their plots. (He et al., 2020)

Journal Article: **He et al., 2020. Proof of concept for rational design of hepatitis C virus E2 core nanoparticle vaccines. Science**

Article by Cheleka AM Mpande