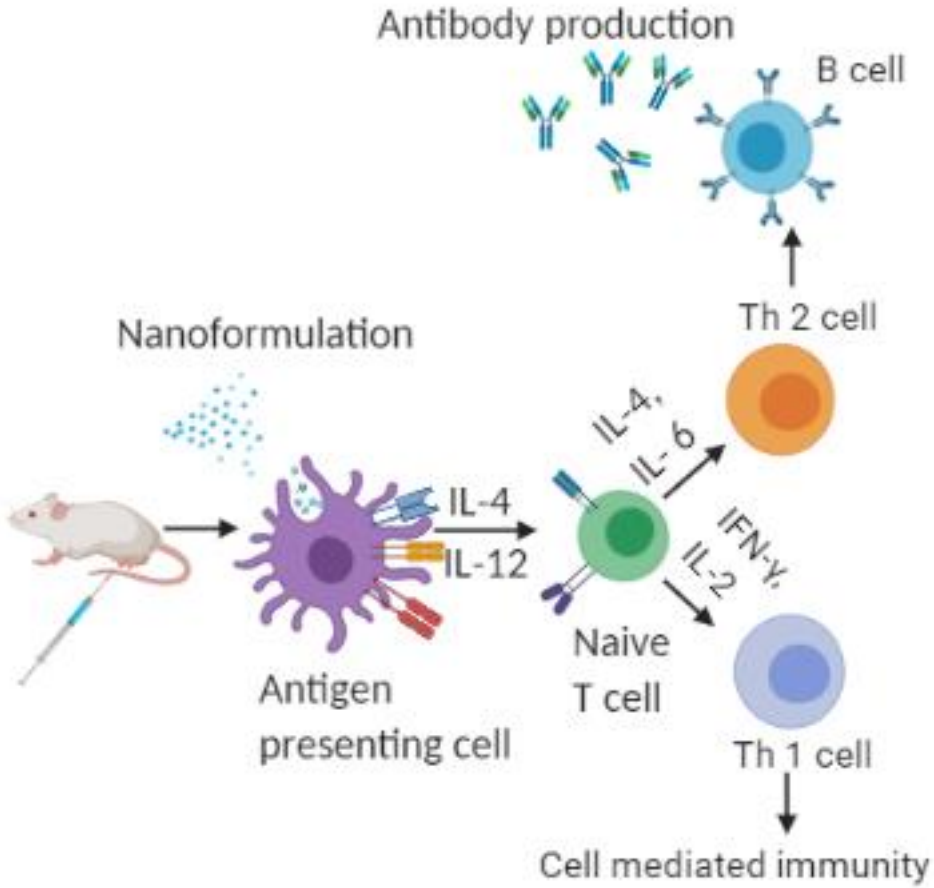
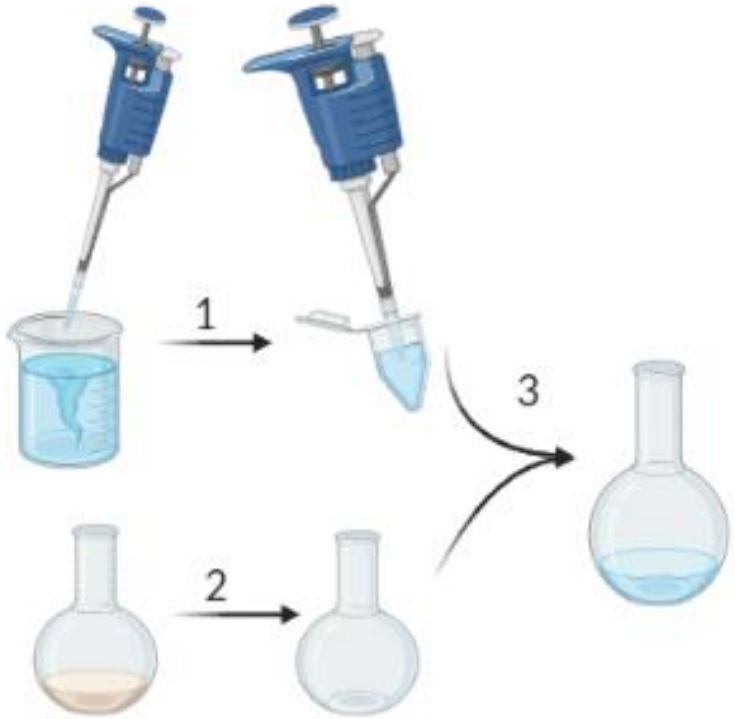


Supplementary figure 1: Proposed mechanism of action of AH np/ NISV-D4 nanoformulation. The immunized nanoformulation is readily taken up by professional antigen presenting cell's (APC) like dendritic cells (DC), thereby upregulating co-receptors like CD 80 and CD 86. The processed peptides are displayed on MHC class II receptors on DC's which are presented to T cell receptor's of a naïve T cell. The DC co-receptors CD 80/ CD 86 bind with CD 28 of the naïve T cells. These interaction's results in cytokine release from the DC's which direct a naïve T cell towards Th1/ Th2 cytokine producing cell, thereby contributing in either cellular response or activating B cell to produce antibodies.



Supplementary figure 2: Preparation of combinatorial AH np/ NISV-D4 formulation. 1) AH np was prepared by mixing equal volume of 0.06 M AlCl3 and 0.18 M NaOH in a magnetic stirrer. The cloudy suspension was washed thrice with sterile deionized water and finally resuspended in 0.1 M phosphate buffer pH 7.4. 2) D4 encapsulated NISV was prepared from span- 60 and cholesterol by reverse phase evaporation method as discussed in the methods section. The mixture containing D4 was emulsified in a water bath sonicator and organic phase evaporated in a rotatory evaporator to obtain a thin film. 3) Combinatorial NISV-D4/AH np formulation was prepared by resuspending the obtained thin film in AH np suspension and used for immunization.