

### Hierarchically porous silica scaffold for cancer vaccine

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Cancer vaccine is a promising immunotherapy to treat cancer by enhancing antigen-specific host adaptive immune system against cancer cells. The efficacy of cancer vaccine can be significantly enhanced by using engineered materials to deliver antigens and adjuvants into antigen presenting cells (e.g. dendritic cells). Here, we prepared three dimensional macroporous and mesoporous silica scaffold vaccine using ovalbumin (OVA) as model antigen for in situ immune cell modulation. The vaccine scaffolds were subcutaneously implanted into the mice and recruited high number of dendritic cells into the scaffold. Furthermore, dendritic cells presenting OVA information were detected at inguinal lymph node, which consequently induced OVA specific cytotoxic T cells. These findings show the vaccine scaffold can arise artificial adaptive cellular immunity against to specific antigens. To verify the effect of the scaffold as cancer vaccine, vaccinated mice were challenged with melanoma (B16-OVA) cells, and tumor suppression was monitored compared to non-treatment or soluble vaccine. Taken together, the scaffold vaccine can be a platform to improve the efficacy of cancer immunotherapy.