

# Tuning Anti-tumor Immune Responses by Adjusting Size of Hydroxyapatite Particles

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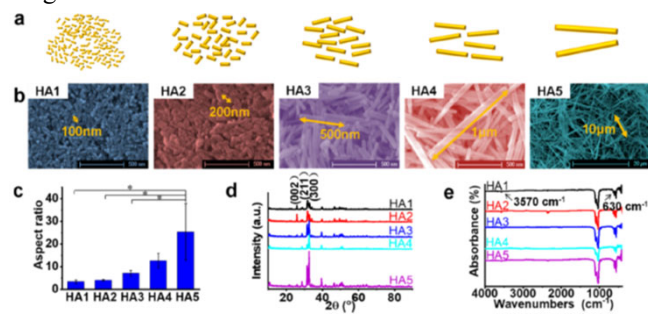
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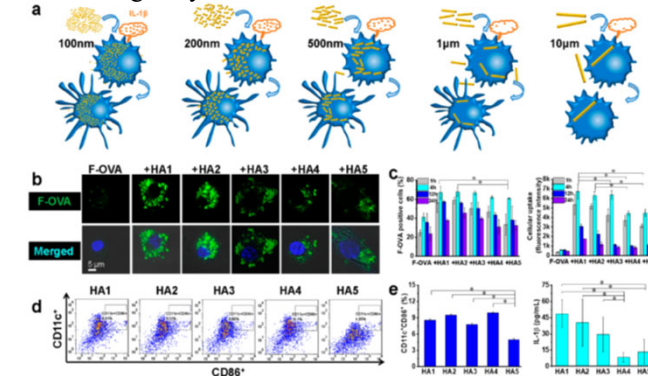
## Statement of Purpose:

Adjuvant is important to enhance and shape the type of antigen-specific anti-tumor immune responses, thus is essential for cancer vaccine. In previous work, we have clarified that ceramic particles such as mesoporous silica, hydroxyapatite (HA) function as an adjuvant for cancer immunotherapy, which induce anti-tumor immunity. However, it was not clear how physical properties such as particle shape, size, and porosity affect the adjuvant capacity of anti-tumor immunity. Herein, the size-dependent immune response of an inorganic adjuvant was clarified.

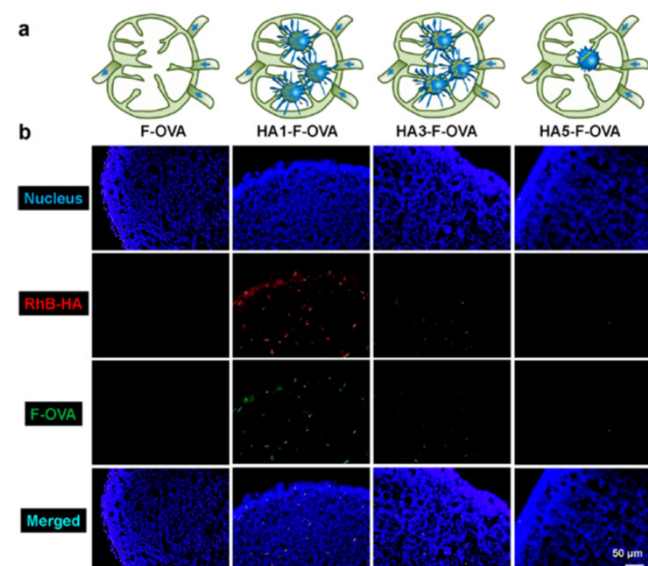
**Result 1:** Tailoring synthesis of HA rods with adjustable length



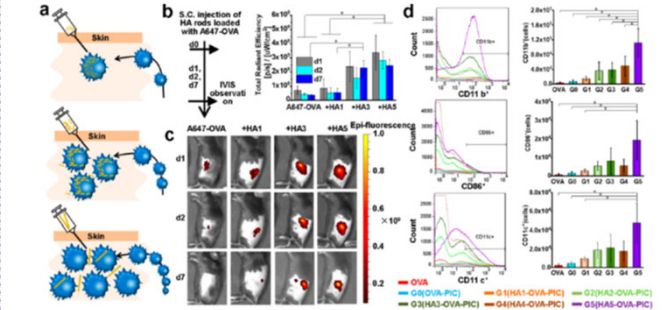
**Result 2:** Shorter HA rods facilitate cellular uptake of loaded-antigen by BMDCs and BMDCs maturation



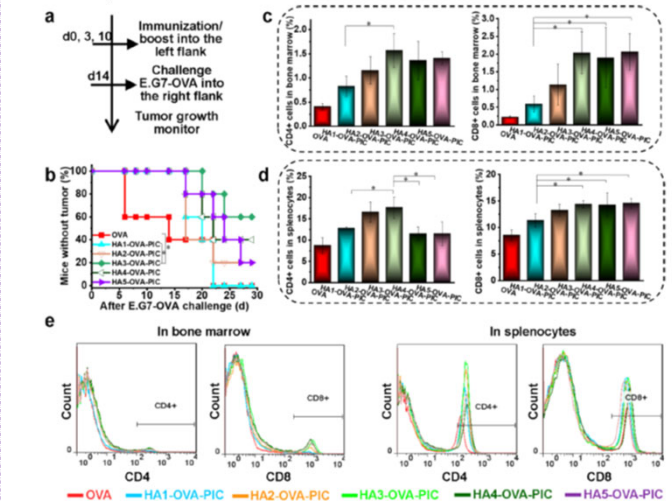
**Result 3:** Shorter HA rods facilitate the delivery of antigen by BMDCs into the lymph nodes



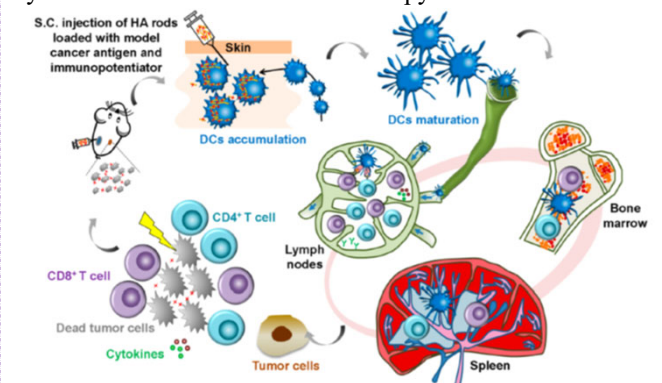
**Result 4:** Longer HA rods prolong antigen retention and promote immune cell accumulation around the injection site



**Result 5:** HA rods with medium size exhibit best anticancer immunity in mice



**Scheme:** Mechanism of an Immune-Targeted Delivery System toward Cancer Immunotherapy



**Conclusions:** Short HA rods with length 100 nm-500 nm promote antigen uptake and DC maturation. Long HA rods with length 500 nm-10 µm prolong antigen release and increase DC accumulation around injection site. HA rods with length of 500 nm take the advantages of both short and long rods, showing best anti-cancer immunity.

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