

# Protein Nanoparticles For Cancer Immunotherapy

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## BRIEF DESCRIPTION

Though new therapeutics for the treatment of cancer are constantly being developed, they often show low efficiency for long-term remission, adverse side effects, and low immune response. Scientists at UCI have found a way to combat these issues with a combination therapy delivered by nanoparticle of both a vaccine, to prime the immune system, and a checkpoint inhibitor to shut down anti-cancer immune responses. This has been shown to prolong survival and promote immune response and immunological memory related to long-term survival.

## SUGGESTED USES

- Treatment of cancers such as melanoma, neuroblastoma, bladder, lung prostate, and breast cancers
- Vaccine priming of immune response through delivery by nanocapsule to increase T-cell activation

## FEATURES/BENEFITS

Simultaneous delivery of vaccine and checkpoint inhibitor ensures both are delivered to the same subcellular compartments, increasing efficiency and immune response. This combined delivery not only primes the immune system but decreases negative side effects seen by delivery of checkpoint inhibitor alone.

## TECHNOLOGY DESCRIPTION

Cancer is a leading cause of death worldwide, with almost 8 million fatalities every year. A new type of treatment called checkpoint inhibitors are used to impair the immunosuppressive environment of tumors that serves as protection for cancer cells. For example, T-cells use a checkpoint protein called PD-1 to probe for disease or infection. Tumors can have these checkpoint proteins that indicate to the immune system that the tumor cells are normal. A checkpoint inhibitor, such as anti-PD-1 block the tumors ability to deceive the immune cells, thus activating the immune system. Unfortunately, checkpoint inhibitors show low efficiency for long-term remission and often have adverse side effects. Scientists at UCI have designed a nanocapsule that solely targets immune activating cells. These researchers have discovered that co-delivery of an anti-cancer vaccine and anti-PD-1 within the immune-targeting nanocapsule increases immune activation and decreases adverse effects. This has been shown to prolong survival and promote immune response and immunological memory related to long-term survival in mice.

## STATE OF DEVELOPMENT

Combination therapy has been tested in a melanoma mouse model and shown to be more effective than the vaccine alone or checkpoint inhibitor alone treatments.

## RELATED MATERIALS

## CONTACT

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## INVENTORS

» Wang, Szu-Wen

## OTHER INFORMATION

## CATEGORIZED AS

- » **Medical**
  - » Delivery Systems
  - » Disease: Cancer
  - » Therapeutics
  - » Vaccines

## RELATED CASES

2019-061-0

» Neek et.al. Co-delivery of human cancer-testis antigens with adjuvant in protein nanoparticles induces higher cell-mediated immune responses. Biomaterials, 2018 156, 194-203. - 11/20/2017

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20230263875	08/24/2023	2019-061

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

► Metabolite-Responsive Hybrid Biomaterials

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