PENN CENTER FOR INNOVATION

Tumor mitochondria vaccine for the treatment of cancer

Immuno-oncology, immunotherapy, cancer vaccine, mitochondria

Inventor

Andrea Facciabene, PhD

Problem

Progression in cancer immunotherapy has been rapid with a number of products currently available and many others in late stage clinical development. However, clinical response to immunotherapies is variable and dependent on cancer types as well as specific characteristics or genetic mutations within a patient's individual tumor. There is a need for tumor-specific therapies with applicability to a range of cancer types.

Solution

The Facciabene lab at the University of Pennsylvania has developed a technology that uses Tumor Associated Mitochondria Antigens (TAMAs) extracted from the tumor as a cancer vaccine. The technology involves pulsing dendritic cells with TAMAs. In an *in vivo* model of renal cell carcinoma (RCC) the vaccine elicits a cytotoxic T-cell response and provides long-term protection from tumor progression when used either prophylactically or therapeutically. The Facciabene lab has established that TAMAs can produce an effective anti-tumor immune response in RCC. Future work will validate the data in human RCC and investigate additional cancer types and combinations with other immunotherapies.

Applications

- Cancer immunotherapy
- Potential in metabolic or mitochondrial diseases

Advantages

- Long-term protection from tumor progression demonstrated in RCC
- Potential use in other cancer types with mutations in mitochondrial proteins (e.g. kidney, colorectal, ovarian, breast, bladder, lung, pancreatic)
- Utilization of a dendritic cell platform validated in humans

State of Development

- *In vitro* and *in vivo* animal data
- Human RCC sample evaluation of mitochondrial mutations and correlation with survival and immune cell infiltration

INTELLECTUAL PROPERTY

- PCT Pending WO2016014613

DESIRED PARTNERSHIPS

- License
- Co-development

REFERENCE MEDIA

- Pierini S et al. J Immunol, 2015, 195 – 4020.
- Penn Medicine News

LEARN MORE

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