

Enhanced immunotherapy of "cold" solid tumors using Tumor tropic *S. Typhimurium* expressing anti-cancer proteins

Functionalized nanoparticles that boost immunogenic cancer therapy with reduced toxicity.

Researchers at Purdue University have developed a tumor tropic *S. Typhimurium* VNP20009 derivative strain that activates M1-like macrophage polarization and cytotoxic T-cell infiltration into tumor tissues. Immune checkpoint inhibitors (ICIs) and genetically engineered T-cells expressing chimeric antigen receptors (CAR-T cells) have been revolutionary for cancer immunotherapy. CAR-T cell therapy of blood cancer has even achieved an outstanding 90% patient response rate. However, these treatment options falter when applied to solid tumors due to the immune-suppressive tumor microenvironment that inhibits T-cell infiltration and activation, ultimately causing T-cell exhaustion. Effective therapies are direly needed to treat cold solid tumors unresponsive to immunotherapy.

The strain developed by Purdue researchers helps oncologists and pharmaceutical companies effectively treat immunologically cold solid tumors by inducing host innate and adaptive immune responses to enhance cancer immunotherapy. This technology disrupts suppressive immune microenvironments and causes rapid tumor destruction, holistically improving malignant cancer treatment. This strain is the first to address the poor response rates of solid tumor immunotherapy and its use may significantly improve patient outcomes.

Technology Validation:

The *Salmonella Typhimurium* VNP20009 strain expressing recombinant methioninase (rMETase) and/or Tumor Necrosis Factor (TNF_alpha) caused rapid tumor destruction of the immunologically cold Lewis Lung Carcinoma (LLC) grown on immunocompetent C57BL/6 mice. The researchers also observed increased tumor apoptosis and a reduced cancer cell proliferation rate.

Technology ID

2024-HE-70612

Category

Pharmaceuticals/Drug Discovery
& Development

Pharmaceuticals/Pharmaceutical
Packaging & Delivery Systems

Pharmaceuticals/Computational
Drug Delivery & Nanomedicine

View online page



Advantages:

- Significantly reduces cancer death rates and accompanying patient suffering
- Precipitates rapid tumor destruction
- Leverages host innate and adaptive immune responses to improve cancer immunotherapy

Applications:

- Oncologists
- Cancer patients with solid tumors
- Pharmaceutical companies
- Cancer treatment
- Cancer immunotherapy

TRL: Pharmaceuticals

Intellectual Property:

Provisional-Patent, 2024-03-11, United States

Keywords: bacterial-based therapy, Medical/Health, Pharmaceuticals, tumor tropic salmonella typhimurium VNP20009 and derivatives