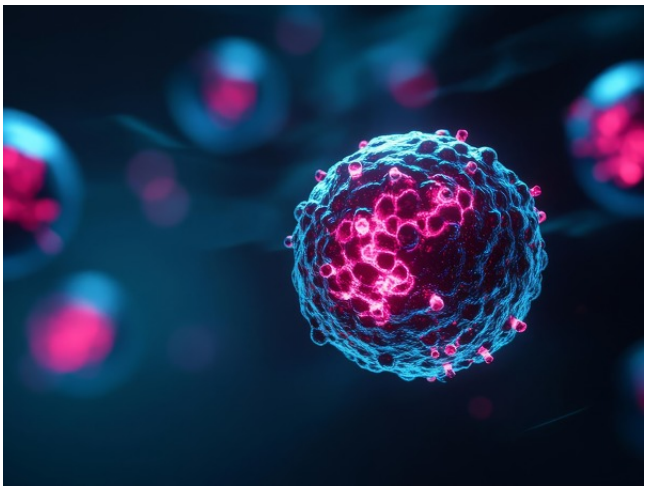
INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

Dual Targeting Myeloid/Breg Cells for Enhanced Cancer Immunotherapy

TECHNOLOGY NUMBER: 2023-516



Technology ID
2023-516

Category
Therapeutics and Vaccines
Life Sciences
Accelerate Blue Foundry - 2025/Life Sciences

Inventor
Duxin Sun

Further information
Tiefei Dong
tiefeid@umich.edu

View online

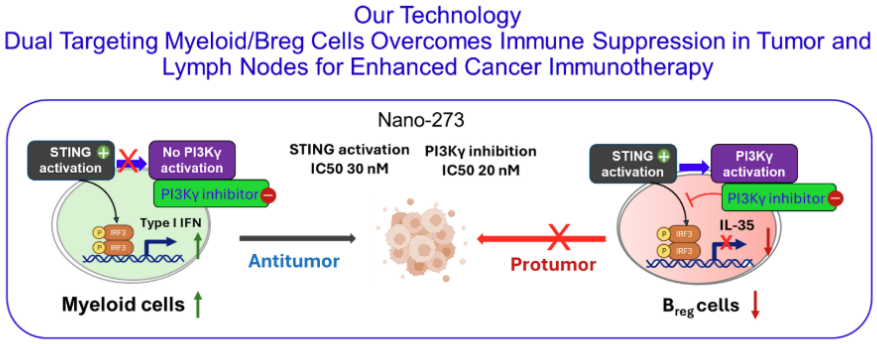
Accelerate Blue Foundry - 2025 (Life Sciences)

OVERVIEW

This technology offers an innovative class of drug compounds that dual target myeloid cells and regulatory B (Breg) cells to overcome immune suppression in tumors and lymph nodes for enhanced cancer immunotherapy.

DESCRIPTION

These new compounds are designed to achieve two important functions: they activate myeloid cells through stimulating an immune pathway called STING, helping the body attack tumors, while also eliminate Breg cells by blocking PI3Kgamma, a protein that can weaken immune responses. Unlike earlier drugs, which can only target immune suppressive myeloid cells but overlook Bregs cells, as well as can cause systemic toxicity , these dual functional compounds are designed to be activated inside myeloid cells and Breg cells to increase efficacy and reduce systemic toxicity.. Further, these dual functional drugs can be packaged inside clinically validated albumin nanoparticles , which guide them directly to lymph nodes and cancer tissue. This targeted delivery helps the drug reach the places where it can do the most good and reduces side effects elsewhere in the body. Together, these features allow for more precise immune activation and toxicity reduction than single-function drugs.



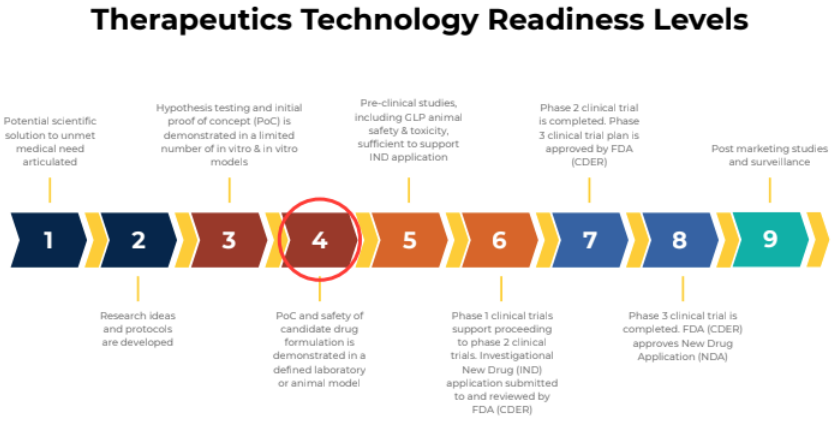
- Dual PI3Kγ/STING targeting drug SH-273 activates myeloid cells and eliminates Breg cells to overcome immune suppression for cancer immunotherapy
- Albumin nanoparticle Nano-273 targets immune cells in the tumor and lymphatic system
- Nano-273 is activated inside myeloid cells and B cells to increase efficacy and reduce toxicity

1) Nature Cancer 2024, Revision; bioRxiv doi: https://doi.org/10.1101/2024.02.14.580378
2) Science Translational Medicine, 2022, 14, eabl3649
3) Cell Chemical Biology 2025, 32,280;
4) J Med Chem 2025, 68,11365

VALUE PROPOSITION

- **Two treatments in one**: Activates immune attack and blocks immune resistance, making it harder for cancer escape treatment.Smart targeting: Clinically validated albumin nanoparticle targets more medicine to reach tumors or immune hubs, which can improve outcomes while lowering dose or side effects.
- **Reduced toxicity**: the dual functional compounds are designed to be activated inside immune cells and tumor cells to improve efficacy and reduce toxicity
- **Flexible use**: Efficacious for many types of cancers, including pancreatic, lung, ovarian, and colon cancers, and can be used as stand alone or combination therapy.

TECHNOLOGY READINESS LEVEL



INTELLECTUAL PROPERTY STATUS

Patent applications pending.

MARKET OPPORTUNITY

There is a large and growing need for treatments that improve immune responses against various types of cancers, especially where current drugs are limited efficacy and toxicity. This technology can be applied in areas such as solid tumors, metastatic cancers. The cancer immunotherapy market is rapidly expanding (expected to reach over $170 billion globally by 2030), with increasing demand for advanced targeted and combination therapies.

REFERENCES

- "Dual Targeting of STING and PI3Kγ Eliminates Regulatory B Cells to Overcome STING Resistance for Pancreatic Cancer Immunotherapy"
- "Albumin nanoparticle containing a PI3Kγ inhibitor and paclitaxel in combination with α-PD1 induces tumor remission of breast cancer in mice"
- "An oral tricyclic STING agonist suppresses tumor growth through remodeling of the immune microenvironment"