

Lay Report

Breast cancer that spreads to the brain is one of the most difficult conditions to treat because the brain's natural protective wall, the "blood-brain barrier", blocks most traditional drugs. With the support of METAvivor, our research team has developed a new way to overcome this obstacle using tiny, natural particles called "extracellular vesicles" (EVs), which act as messengers between cells.

Over the past year, our project has achieved several breakthroughs:

- **Engineering More Powerful Messengers:** We successfully created a specialized version of these messengers from the body's own immune-alerting cells, dendritic cells. By removing an internal "brake" within these cells, we made the messengers much more effective at teaching the immune system to recognize and attack breast cancer cells.
- **A Novel Delivery Strategy:** We demonstrated that delivering these messengers through a combination of a simple nose spray and a standard intravenous injection allows them to reach the brain effectively. This "dual-route" approach bypasses the brain's protective barrier and ensures the treatment gets exactly where it is needed.
- **Proven Safety:** Most importantly, our studies confirmed that this treatment is safe and well-tolerated, showing no harmful side effects in our preclinical model tests.
- **Stopping Tumor Growth:** In tests using aggressive laboratory models that mimic human triple-negative breast cancer, our new therapy significantly slowed down and reduced the size of tumors in the brain.
- **Boosting Existing Treatments:** We discovered that our therapy can act as a powerful "booster" for existing immunotherapy drugs. When used together, they were much more effective at inhibiting cancer in the brain than either treatment alone.

Impact on Patients: This research offers a promising new hope for patients living with triple-negative breast cancer that has spread to the brain. By turning the body's own immune system into a targeted defense force that can finally cross the blood-brain barrier, we are working toward a future where brain metastases can be treated more effectively and less invasively. We are now using these results to seek further funding for larger studies, bringing us one step closer to providing a better quality of life and improved survival for patients facing this difficult diagnosis.