

Researchers discover brain cancer treatment using genetic material from bone marrow cells

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In a first-of-its-kind experiment using microvesicles generated from mesenchymal bone marrow cells (MSCs) to treat cancer, neurological researchers at Henry Ford Hospital have discovered a novel approach for treatment of tumor. Specifically, the research team found that introducing genetic material produced by MSCs, significantly reduced a particularly resistant form of malignant brain tumor in living lab rats.

"This is the first foray of its type in experimental cancer therapy, and it represents a highly novel and potentially effective treatment," says Michael Chopp, Ph.D., scientific director of the Henry Ford Neuroscience Institute and vice chairman of the Department of Neurology at Henry Ford Hospital. The research is published in the current issue *Cancer Letters*.

"I think this is an important and very novel approach for the treatment of cancers, and in this particular case the treatment of glioma," says Dr. Chopp. "We have been at the forefront of developing microRNAs as a means to treat disease, such as cancer and [neurological injury](#)."

"This study shows it is effective in the living brain, and may even lend itself to specific cancer therapy, customized for the individual patient," Chopp adds

Chopp and his colleagues focused their efforts on glioma, by far the

most common type of [malignant brain tumor](#), and one with a notably [poor prognosis](#) for survival.

[Tumor cells](#) were surgically implanted in the brains of anesthetized male [lab rats](#) and allowed to grow for five days. The tumors then were injected with exosomes containing molecules of a microRNA called miR-146b – found in earlier Henry Ford research to have a strong effect on glioma cells.

Exosomes are microscopic "lipid bubbles" that once were thought to carry and get rid of "old" proteins that were no longer needed by the body. After they were more recently found to also carry RNA, whole new fields of study were suggested – including groundbreaking work by Henry Ford researchers.

In their rat study, Chopp and his colleagues used MSC [bone marrow cells](#) to produce the exosomes containing the miR-146b they injected into the cancerous tumors.

Five days after this treatment, the rats were euthanized and their brains were removed, prepared for study, and examined. Tumor size was measured using computer software.

"We found that one injection of exosomes containing miR-146b five days after tumor implantation led to a significant reduction in tumor volume at 10 days after implant," Chopp says. "Our data suggest that miR-146b elicits an anti-tumor effect in the rat brain, and that MSCs can be used as a "factory" to generate exosomes genetically altered to contain miR-146b to effectively treat tumor. "

Provided by Henry Ford Health System

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