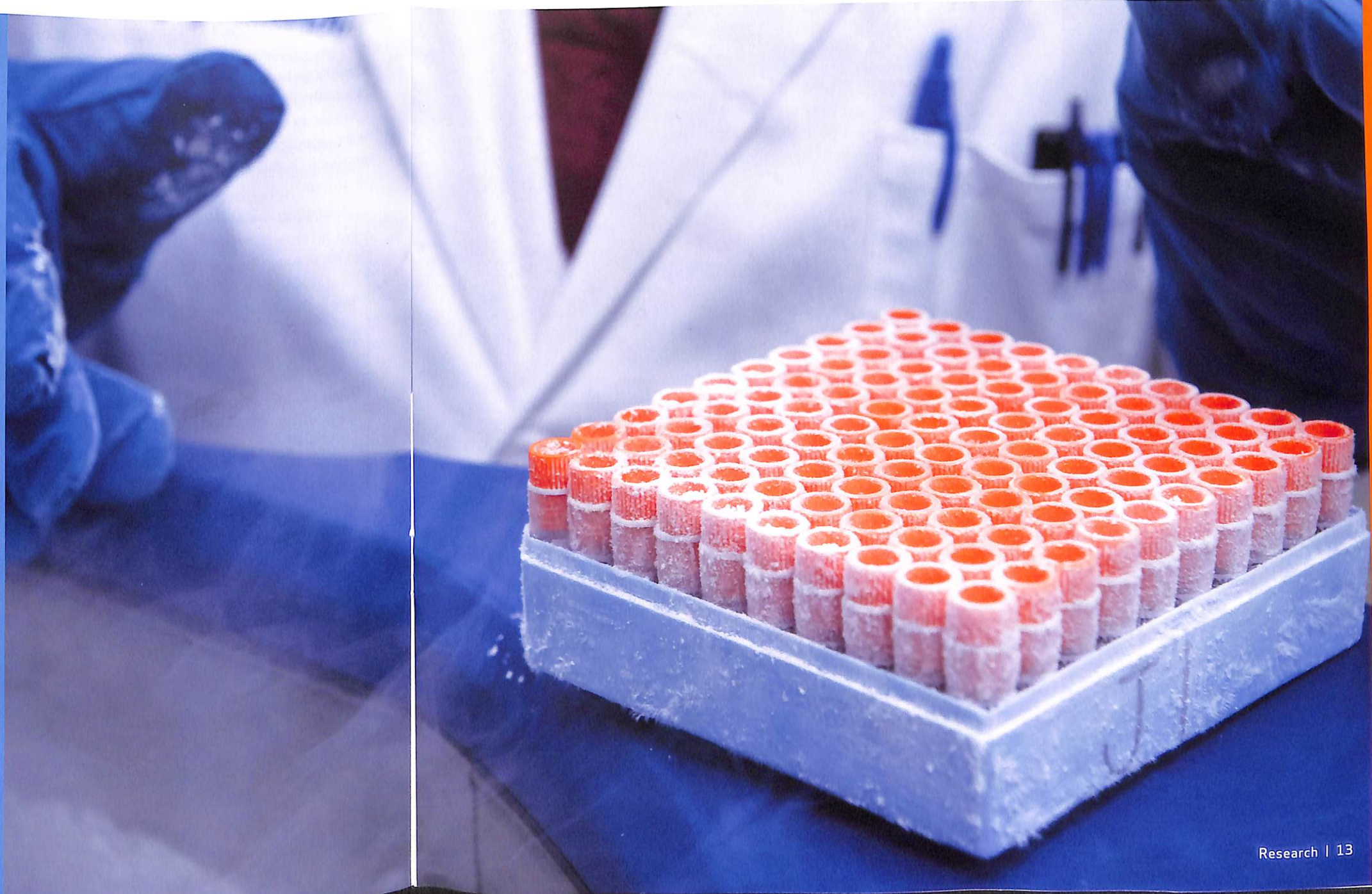


Researcher earns prestigious grant advancing brain cancer treatment

The NIH R01 grant will support Dr. Houtan Noushmehr's research applying DNA methylation, or epigenetics, to liquid biopsy.

by Lisa Harris





"It is not one person leading this: it's a team of people. It is a very collaborative-type award because it involves neurooncologists, neurosurgeons, neuropathologists, bioinformaticians, basic scientists...; it's really a team science effort, and I don't think this grant would have been achieved without that collaborative nature that we have here at Henry Ford."

Houtan Noushmehr, Ph.D.
Researcher at Henry Ford Health's
Hermelin Brain Tumor Center

Henry Ford Researcher earns NIH R01 grant

Henry Ford Health researchers are world-renowned for the trailblazing discoveries they make at Henry Ford. Now one of our own was recently awarded the oldest and most prestigious grant one can receive for health-related research.

Houtan Noushmehr, Ph.D., a researcher at Henry Ford Health's Hermelin Brain Tumor Center, earned a \$2.9 million National Institutes of Health (NIH) R01 grant for his unprecedented research applying DNA methylation, or epigenetics, to liquid biopsy. Dr. Noushmehr's discovery is transforming the method in which brain cancers are detected, treated and monitored.

Dr. Noushmehr launched his illustrious career path studying epigenetics while working on his Ph.D., project at USC's Norris Comprehensive Cancer Center. In a ground-breaking study, he and his research team profiled over 100 brain cancer samples using DNA methylation and identified very distinctive subtypes of glioma that had vastly different clinical outcomes — the defined groups were titled G-CIMP or Glioma-CpG Island Methylator Phenotype. This was a major discovery, because prior to the study, researchers had never differentiated brain tumors into clinical subtypes by molecular features using epigenetics.

Applying epigenetics to glioma research had such extraordinary results, Dr. Noushmehr decided to apply DNA methylation to liquid biopsy. He examined cell-free DNA using epigenetics, or DNA methylation, rather than looking at genetics or DNA mutations, which had been standard protocol for decades. By extracting plasma from patients' blood and profiling their epigenetics, Dr. Noushmehr was able to detect cancer, diagnose the type of brain tumor, and monitor tumor progression or recurrence over time. He found the majority of profiled DNA is not emanating from the tumor itself; it is actually the body's immune system emitting a cancer-specific signature into the blood as it reacts differently to specific tumor types.

DNA methylation liquid biopsy promises patients earlier brain cancer diagnoses without an invasive brain biopsy. The ability to detect the type of brain cancer and its aggressiveness using a simple, cost-effective blood test allows physicians to deliver treatment to patients much quicker, yielding better outcomes, especially for aggressive tumors.

Epigenetic liquid biopsy also promises superior results in tumor progression/recurrence monitoring.

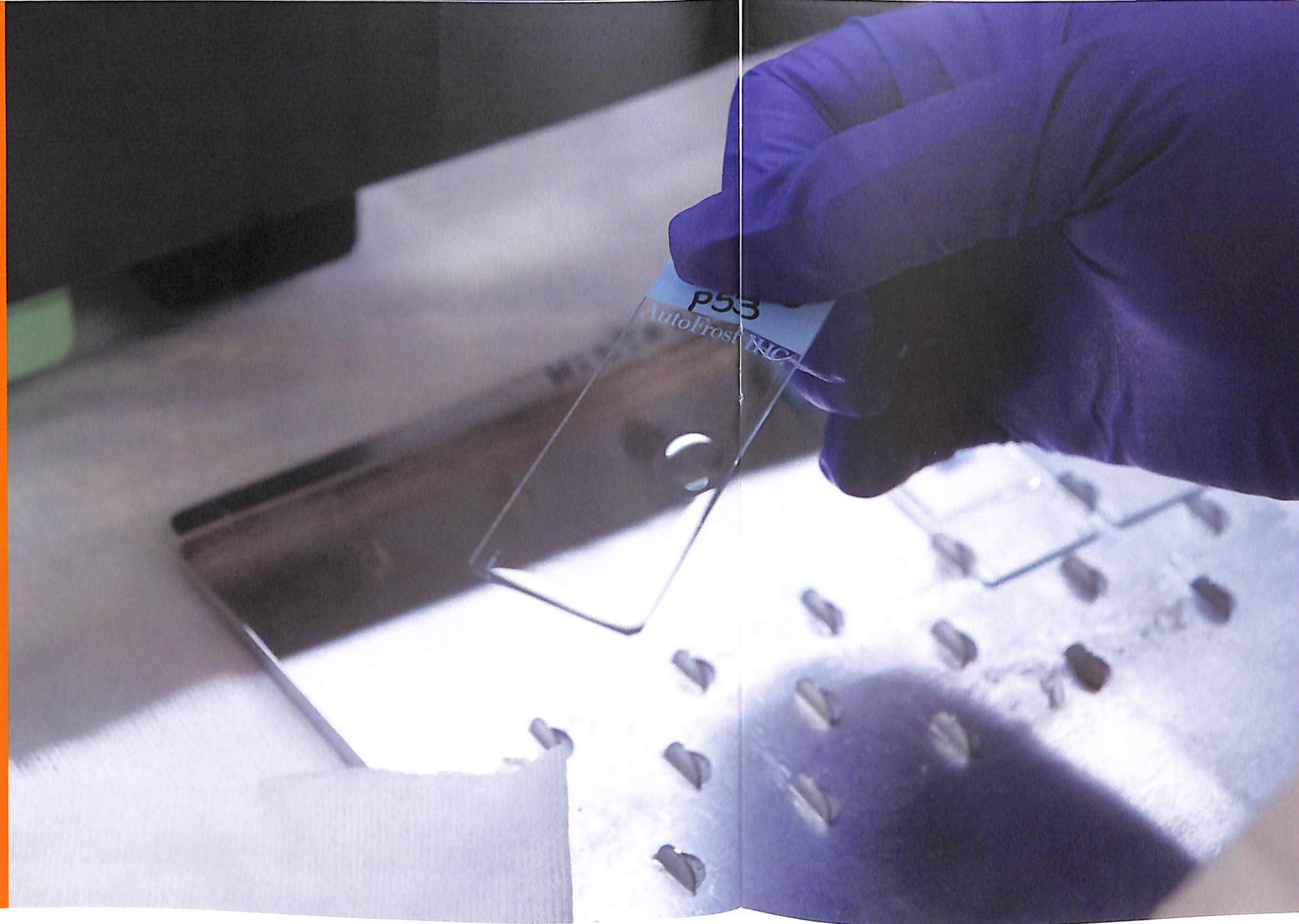


After treatment, patients typically have follow-up testing every three months to monitor recurrence via MRI. Because brain cancer has an approximate 80% recurrence rate and can grow quickly, weekly blood sample monitoring enables immediate detection and treatment, rather than waiting months to test, as the cancer could grow considerably during that time.

By physicians tracking "real-time" cancer progression, they can administer prompt treatment, resulting in greatly improved clinical outcomes for patients. Dr. Noushmehr is using his recently bestowed R01 grant to study whether these findings can be replicated on a large scale.

Prior to receiving the NIH R01 grant, Dr. Noushmehr received numerous grants that significantly supported his liquid biopsy research. Thanks to funding from the Jeffries Precision Medicine Center, Game On Cancer, Department of Defense, as well as others, Dr. Noushmehr was able to gain the preliminary data needed to be considered for an R01 grant — the NIH R01 would have been unattainable without this initial philanthropy and federal support.

The research findings resulting from this R01 funding will also help bring NCI designated cancer status one step closer for Henry Ford Health. Dr. Noushmehr is currently applying for two other NIH R01 grants to fund additional cancer research.



"I am applying something that I applied 12 years ago as a Ph.D. student to liquid biopsies, and we are getting remarkable results out of it, so it is telling us that epigenetics is a really important marker that people have always really dismissed decades back. I decided to apply it to liquid biopsy, and that's where all these amazing results came out of this work that led to this R01 grant."

Houtan Noushmehr, Ph.D.
 Researcher at Henry Ford Health's
 Hermelin Brain Tumor Center



"You don't strive for one; you keep going. To keep your research going, you have to keep getting more...R01s," he said.

Dr. Noushmehr strongly believes collective effort is vital in research. When he made the liquid biopsy discovery, he realized immediately the results had to be corroborated by researchers around the world. He, along with colleague Susan Short, Ph.D., an academic clinical oncologist from the University of Leeds in the United Kingdom, established the Brain Liquid Biopsy Consortium, a network open to any researcher in the world interested in liquid biopsy. This

consortium is a vital resource for researchers to share information and resources.

Dr. Noushmehr also feels strongly that every person on the research team is an equal and important member. "It is not one person leading this: it's a team of people. It is a very collaborative-type award because it involves neurooncologists, neurosurgeons, neuropathologists, bioinformaticians, basic scientists...; it's really a team science effort, and I don't think this grant would have been achieved without that collaborative nature that we have here at Henry Ford"