

Scientists discover cancer markers may be present early during human development

August 5 2015



Researchers at the Virginia Bioinformatics Institute have uncovered a link between the genomes of cells originating in the neural crest and development of tumors—a discovery that could lead to new ways to diagnose and treat cancer.

The new finding, recently published in [Oncotarget](#), resolves why some [cancer types](#) share genomic and clinical features.

The discovery may also lead to new ways to diagnose and treat brain cancer, such as gliomas, medulloblastomas, and neuroblastomas; and [skin cancer](#), known as melanoma.

More than 22,000 new cases of [brain cancer](#) and more than 73,000 new cases of skin cancer and were expected to arise in Americans in 2015, according to the National Cancer Institute.

To reveal when cancer-causing genomic changes occur, a research group led by Harold "Skip" Garner, a professor in the departments of biological science, computer science, and basic science at Virginia Tech Carilion Medical School, analyzed an often ignored part of the human genome—repetitive DNA sequences referred to as microsatellites.

Over 1 million microsatellites exist in the human genome, including in [neural crest](#) tissues, a thin layer of cells within an embryo that contains genetic instructions to build hundreds of cell types, from neurons to adrenal cells.

When cells migrate from the neural crest, researchers say the instructions may become garbled, causing [cancer cells](#) to emerge. Neurological tumors, for example, may arise from glial cells that develop from the crest.

Researchers with the institute's Medical Informatics Systems Division say cancer types can be found or predicted from specific markers within these repetitive sequences, known as cancer-associated microsatellite loci, or CAML.

Long considered "junk DNA" or "dark matter" within the genome

because their function was unclear, microsatellites are known for their role in certain diseases such as Fragile X and Huntington's disease.

Garner's group has shown that these regions can be informative about diseases ranging from cancer to autism spectrum disorder.

With more study, researchers believe interrelated hereditary and genetic traits of certain cancers can be traced to their common origin at the neural crest, leading to potentially better therapies and easier tumor identification.

The findings have been licensed to Genomeon, a company co-founded by Garner to develop new ways to assess cancer risk, create diagnostics, and explore potential drug targets to help [cancer](#) patients.

Provided by Virginia Tech

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