

Team find gene signature profile for metastasis

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A common signature of tiny, specific pieces of non-coding genetic material known as microRNAs (miRNAs) may be directly involved in the spread of cancer to other parts of the body. Researchers at the Kimmel Cancer Center at Jefferson in Philadelphia and Ohio State University Medical Center in Columbus have identified such a signature, made up mostly of overexpressed miRNAs. The findings, reported at the annual meeting of the American Society of Clinical Oncology in Chicago, may represent a novel diagnostic tool in characterizing gene targets in metastatic cancer.

MiRNAs play a number of roles in biological regulation, including development and cell differentiation. When damaged, they can contribute to cancer by either turning on cancer-causing genes or by inhibiting tumor-blocking genes. The ways that MiRNAs are expressed have been used to profile tumor types in humans.

Because miRNAs are involved in cancer development and progression, scientists led by Raffaele Baffa, M.D., associate professor of Urology at Jefferson Medical College of Thomas Jefferson University and Anne Rosenberg, M.D., clinical professor of Surgery at Jefferson Medical College, in collaboration with a research team led by Carlo Croce, M.D., director of Ohio State University's human cancer genetics program and professor and chair of the Department of Molecular Virology, Immunology and Medical Genetics, wanted to see if there was a specific gene signature that characterized metastasis.

Using microarray technology to test many genes at once, they compared different organs – breast, lung, bladder and colon – to see if miRNAs were either increased or decreased in activity. They analyzed the miRNAs in both primary and metastatic tumors from 43 patients, including 13 breast cancers, 10 lung cancers, 10 bladder urothelial cell cancers and 10 colon cancers.

They discovered that some miRNAs are organ-specific. "Some are increased and decreased specifically in certain organs, telling us that these are commonly involved in the metastatic process," says Dr. Baffa.

Because of the ups and downs in miRNA activity, "many miRNAs that are involved in metastasis are not necessarily specific for one organ, but rather are related to the cell acquiring the ability to spread." The researchers also found a direct association between the alterations in some miRNAs and changes in target proteins.

Many of the miRNAs that were overexpressed in primary tumors had previously been reported, he says, confirming that miRNA signatures are useful in classifying tissue origin.

Source: Thomas Jefferson University

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