New class of RNA molecules may be important in human cancer

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Research here shows that an obscure form of RNA, part of the protein-making machinery in all cells, might play an important role in human cancer.

These ultraconserved non-coding RNAs (UCRs) have been considered "junk" by some researchers, but a new report in the September issue of the journal *Cancer Cell* indicates that this may not be the case.

The study found that UCRs, like classic oncogenes, can contribute to cancer development. It also showed that the type and amount of UCRs is different in cancer cells for each of three cancer types, suggesting that these molecules might prove useful in diagnosing the disease and in determining a patient's prognosis and perhaps even treatment.

"Along with oncogenes, tumor suppressor genes and microRNA, this seems to be another family of genes that plays an important role in cancer," says principal investigator Carlo M. Croce, professor and chair of the department of molecular virology, immunology and medical genetics at Ohio State University and a researcher with Ohio State's Comprehensive Cancer Center.

"Our next step is to learn how they work and if they are good targets for drug therapy."

The new study involved a number of experiments. One showed that some genes that encode for UCRs are located in chromosome regions

that are often lost or damaged in cancer cells. This suggests that certain UCRs might be genetic markers for cancer susceptibility.

In another experiment, Croce and his colleagues measured the activity of UCR genes in human chronic lymphocytic leukemia, and colorectal and liver cancer. Overall, they examined 133 tumor samples and 40 samples of corresponding normal tissue.

Each cancer type showed a specific activity pattern for certain UCRs, suggesting that these molecules might one day help distinguish between different types of human cancers.

Moreover, the investigators identified a signature of five UCRs able to differentiate a slowly progressing form of chronic lymphocytic leukemia and a form that progresses quickly and aggressively.

At the same time, they discovered that some of these UCRs might be regulated by microRNAs. “This finding was particularly intriguing because it suggests a totally new regulatory mechanism that involves noncoding RNAs,” Croce says.

Finally, this study showed that artificially lowering the level of one UCR in colon cancer cells caused many of them to die, reducing their spread by almost half and showing that UCRs can serve as oncogenes.

“Overall, our findings indicate that these molecules are involved in cancer,” Croce says. “But we need to learn if they are also involved in other diseases such as Alzheimer’s and heart disease.”

Source: Ohio State University Medical Center