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Researchers at the University of Alabama at Birmingham (UAB) Department of Pathology have discovered a set of four biomarkers that will help predict which patients are more likely to develop aggressive colorectal cancer and which are not. The findings also shed light on the genetics that result in worse colorectal cancer-treatment outcomes for African-Americans, compared with Caucasians, the researchers said.

In data presented April 19 at the American Association of Cancer Research annual meeting in Washington, D.C., Liselle Bovell, a graduate student working in the laboratory of UAB Associate Professor of Pathology, and Cancer Center Senior Scientist Upender Manne, Ph.D., discovered that patients who tested positive for higher levels of a genetic biomarker called microRNA (miRNA) had increased risk of death after being treated for colorectal cancer.

In genetic tests of tumor samples from the patients, the presence of higher levels of miRNA-21 and miR-106a signaled poorer prognosis after treatment for both Caucasian and African-American patients compared with patients who did not have the higher miRNA levels. The presence of higher levels of miR-181b and miR-203 signaled poorer prognosis after treatment for African-American patients, but not for Caucasians.

“This knowledge gives us solid, prognostic information, so we can better manage patients with these cancers early after diagnosis or surgery,” Bovell said.

Nobel Laureate Philip A. Sharp, Ph.D., of the Koch Institute for Integrative Cancer Research at the Massachusetts Institute of Technology, hosted a press conference at the annual meeting that included Bovell and other researchers. In a statement, Sharp said, “The science of miRNAs and related small RNAs will continue to generate new insights into cancer and possible future treatment.”

The UAB researchers analyzed data from 218 patients who underwent surgery and other treatments for colorectal cancer at UAB Hospital between 1982 and 2004. They examined the gene-test results of tumor and benign-tissue samples and discovered the four miRNAs important to assessing patient survival.

For many cancers, including colon cancer, African-Americans have lower survival rates than whites. Possible reasons behind this disparity — including genetic variation, tumor characteristics, access to health care and other factors — are being examined extensively.

“Our findings underscore the potential clinical usefulness of miRNAs in studying cancer risk and cancer progression, and we’ve shown that race and ethnicity should be considered in the evaluation,” Manne said.

The research is a partnership between UAB and the Morehouse School of Medicine in Atlanta.

Funding for the work comes from a National Cancer Institute grant held by Cancer Center Director Edward Partridge, M.D. The UAB Cancer Center and Morehouse are partnered, along with Tuskegee University, to increase the research capabilities of minority-serving institutions to conduct cancer health-disparity research.

The UAB Department of Pathology provides extensive clinical services and instruction while maintaining large and productive research programs. Its clinical services — including inpatient, outpatient and outreach — encompass more than 6 million procedures per year. UAB's pathology training programs are among the nation's best, and its faculty has achieved national and international recognition in service, teaching and research.

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