

Mayo oral cancer study shows full tumor genome

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Mayo Clinic researchers along with collaborators from Life Technologies are reporting on the application of a new approach for sequencing RNA to study cancer tumors. Their findings from a proof-of-principle study on oral carcinomas appear in the current issue of *PLoS One*, the online science journal.

VIDEO ALERT: Additional audio and video resources, including comments by Dr. Smith, are available on the Mayo Clinic News Blog

To explore the advantages of massively parallel sequencing of genomic transcripts (RNA), the researchers used a novel, strand-specific sequencing method using matched tumors and normal tissues of three patients with the specific [cancer](#). They also analyzed the genomic DNA from one of the tumor-normal pairs which revealed numerous chromosomal regions of gain and loss in the tumor sample.

The key finding of this work was that alterations in [gene expression](#) which can arise from a variety of genomic alterations frequently are driven by losses or gains in large chromosomal regions during [tumor development](#).

In addition to the specific tumor findings, this study also demonstrated the value of this RNA sequencing (RNA-Seq) method. It will allow researchers to measure strand-specific expression across the entire sample's transcriptome. This technology reveals far more detail about genome-wide transcription than traditional microarrays.

"This method allows us to investigate genetic changes at a level that we were never able to see before," says David Smith, Ph.D., Mayo Clinic genomics researcher and corresponding author of the study. "This provides us with much more information about alterations during cancer development that could reveal important therapeutic targets. We can more completely understand the relationship between an individual's genome and the alterations to that which result in disease.

This is a huge step in speed, detail and diagnostic power for the field of individualized medicine. This transforms how we are going to study cancer -- and how we're going to practice medicine -- in the very near future."

The urgency of this condition points to the need for more efficient technologies and methods. Head and neck cancers are the sixth most prevalent carcinomas in the world. Advanced stage oral and throat cancers have a five-year survival rate of only 50 percent in the United States. Information provided by these and continued studies will help to better characterize the molecular basis of [cancer development](#). That information can hopefully define better therapeutic strategies for treating an individual's specific cancer.

Provided by Mayo Clinic

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