Transcript Details
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ReachMD
www.reachmd.com
info@reachmd.com
(866) 423-7849

The Search for Radioresistance Biomarkers in Head and Neck Squamous Cell Carcinoma

Announcer:
You're listening to *Project Oncology* on ReachMD. On this episode, Dr. Heath Skinner joins us to talk about the search for potential biomarkers of radiation resistance in head and neck squamous cell carcinoma. Dr. Skinner is a Professor and Chair of Radiation Oncology at the University of Pittsburgh School of Medicine. Let's hear from him now.

Dr. Skinner:
When we look at radiation resistance in head and neck squamous cell carcinoma, things that make a biomarker particularly informative or promising are relatively straightforward. Firstly, is it found enough in the tumor to be generally detectable? If something is almost below the limit of detection, in most cases, it makes it a hard biomarker.

Secondarily, is there a big difference between the tumor and the normal tissue around it? If you've got a biomarker that seems to be associated with resistance to radiation but is also highly expressed in normal tissue, that makes targeting that biomarker a bit of a problem. Because what you're looking for is what we call a therapeutic index. If you're going to look at a biomarker that you're going to actually target—a biomarker that drives radioresistance as opposed to a passenger—you really want something that's high in a tumor and low in the normal tissue so that when you're going to inhibit that biomarker to improve response to radiation, you're also not causing a lot of normal tissue toxicity in the area around the tumor. So those are things that we look at.

I think that the omics are useful in determining biologic signals meaningful for understanding radiation response in that you can look at the totality of a tumor in many respects by utilizing modern methods. And omics are a very broad category at this point. It doesn't just necessarily include the genomics of the tumor, the composition of the mutations, or the frequency of the mutations; it also looks at the levels of gene expression in the tumor, both in the tumor cells as well as in the infiltrating immune cells. It also looks at protein expression via proteomics because if something is expressed at the gene level, it doesn't necessarily mean it's actually there in protein form and doing what you think it's doing. It looks at the composition of the different immune cells. And then even beyond that, it looks at the radiomics of a tumor by utilizing imaging, whether that's CAT scan or an MRI, and analyzing it very closely, usually now with artificial intelligence assistance, to try to figure out if any particular characteristics of the imaging portion of the tumor are associated with a given outcome.

So we have a wealth of data in regards to almost every aspect of the tumor: the gene expression, the mutational profile, the protein expression, the tumor infiltrate, the imaging characteristics, and even the way a tumor looks to the naked eye. And if we can incorporate all of these things in the right way, in a smart way, and in a way that is linked to clinical treatment and clinical outcome, there's a very real possibility that we could model tumors even on an individual basis to truly try to figure out for a given patient what portion or aspect of the tumor is driving response to radiation.

Announcer:
That was Dr. Heath Skinner talking about the search for potential biomarkers of radiation resistance in head and neck squamous cell carcinoma. To access this and other episodes in our series, visit *Project Oncology* on ReachMD.com, where you can Be Part of the Knowledge. Thanks for listening!

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