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## Investigating a Potential Serum Biomarker for Lung Cancer

### Announcer

You're listening to Closing the Gaps in Non-Small Cell Lung Cancer on ReachMD, sponsored by Lilly. Here's your host, Dr. Paul Doghramji.

### Dr. Doghramji:

Though non-small cell lung cancer remains the most prevalent form of lung cancer worldwide, treatment outcomes differ drastically between patients, even when diagnosed at the same stages of disease. For this reason, the quest to find biomarkers identifying patients who are most likely to develop metastatic disease has become a central goal in lung cancer research. Today, we'll talk with a leading member of a new investigation identifying one such biomarker and the research path helping put it on the map.

Welcome to Closing the Gaps in Non-Small Cell Lung Cancer on ReachMD. I'm Dr. Paul Doghramji, and here to walk us through a recent study targeting a potential serum biomarker for lung cancer is senior author Dr. Tony Hu. Dr. Hu is Professor and Weatherhead Presidential Chair in Biotechnology Innovation at Tulane University Medical School.

Welcome to you, Dr. Hu.

### Dr. Hu:

Hi, glad to be here.

### Dr. Doghramji:

Before we jump into the study, help me understand the circumstances that set you on this path and how your collaboration with coauthors from other institutions and specialty areas got started.

### Dr. Hu:

Well, thank you so much for the opportunity to introduce the project. It has to go back to 4 years ago when I first time talk with Dr. Zhongxing Liao from MD Anderson Cancer Center. We're talking about her well-organized clinical cohorts about all those patients, including the 250 lung cancer patients. They are actually all on the clinical trial to test the proton radiation therapy. The very initial focus is seeing if we can identify any new biomarkers for the toxicity and the toxicity triggered by the treatment. Then I realized these are very urgent questions, but from the person working in the biomarker field, I feel this cohort can contribute better for identifying some new markers to predict the metastasis because this is including the very organized longitudinal collections before treatment and also the different time points during the treatment, so then we started these collaborations on it.

### Dr. Doghramji:

So, as a refresher, can you walk us through the ways extracellular vesicles contribute to metastatic disease?

### Dr. Hu:

Yeah, definitely. We're actually not the first one reporting how extracellular vesicles influence or regulate the metastasis, and before us, there's a lot of papers reporting how this vesicle functions during this metastatic procedures; but for us, we think that they are really short of such biomarkers for prediction and/or early detection of metastasis, and the major reason is the current available biomarkers—generally, they are in the very low concentration, but the extracellular vesicle is exceptional, and every single cell can secrete 10,000 vesicles per day, and in 1 µl of plasma or serum, you can detect a 107 power vesicles, so that's a lot. So, we have the way where we can identify the very special biomarkers that's highly specific to cancer metastasis, and then we can provide the detection assay with greater diagnostic power

Dr. Doghramji:

That's very interesting. So, how did this particular tumor protein carried by extracellular vessels get targeted as a potential biomarker?

Dr. Hu:

Well, we identified it as markers through the comparative proteomics, and they were starting from the metastatic cell line and a nonmetastatic cell line, and we do the proteomics for all the exosomes isolated from the individual cell lines, and then we figure out there is several targets we can use, and we do the Western Blot and other validation measures to confirm they do correlate with the metastasis, and so the TSN8 has a very strong association with cancer metastasis but not on the extracellular vesicle yet, so this is really the first time report this marker on exosome can provide the greater differentiation power between the metastasis and the non-metastasis group.

Dr. Doghramji:

For those just tuning in, you're listening to Closing the Gaps in Non-Small Cell Lung Cancer on ReachMD. I'm Dr. Paul Doghramji, and today I'm speaking with Dr. Tony Hu, senior author of a study investigating a potential biomarker for earlier identification of metastatic lung cancer.

So, let's go on, Dr. Hu. Let's consider some of the clinical impacts of this research. What steps are needed to incorporate this biomarker into detection assays? And is that a straightforward process or something else all together?

Dr. Hu:

Well, yes, that's a really good question, and we're working on the biomarkers and the next step which will think about how to translate them to the clinical practice. In the paper we report biomarkers using the traditional ELISA, because every time we want to report a new biomarker, we should be using the accepted gold standard to profile them. The ELISA method has some limitations, and so we're trying to address this, especially to use the ELISA to characterize the extracellular vesicle, and the sensitivity will be an issue.

In the meanwhile, our group is also developing another technology, which is called the nanoplasmonic-enhanced scattering detection assay. The method has been published in Nature Biomedical Engineering a couple of years ago, and so the next step we're going to incorporate the detection of TSN8 on this nanoplasmonic-based assay by providing more sensitive and either to handle and higher throughput assay for the clinical translation.

Dr. Doghramji:

So, how do you see clinical practice changing with the eventual addition of a reliable biomarker against this disease?

Dr. Hu:

Well, I would say there's a lot of effort towards this aim because in the clinic it's so important to offer the patients the very individualized treatment strategy, so we're going to continue validating the new biomarkers and the detection technologies. And I would say that such detection could help diagnose patients who are at a high risk for having their cancer metastasis, and if we can really pick up these patients as early as possible, the doctor can really offer the more effective treatment options.

Dr. Doghramji:

Do you anticipate any hurdles or barriers towards advancing this biomarker testing in practice, whether that's confirming its sensitivity or specificity or just being able to get reliable samples with blood draws?

Dr. Hu:

Yes that has been the longstanding headache for the biomarker scientists, but we're pretty lucky to have the NCI Early Detection Research Network to support this field, and so through the joint effort from the different institutes in the US, the scientists already worked out the best way to validate the cancer biomarkers, so we're going to collaborate with them in evaluating the performance of this biomarker through their validation protocol. Because right now we're focusing on the molecular biomarkers more than other traditional biomarkers, and the sample collection, that could be something which has been ignored by many people, and so the sample collection is very critical for biomarker application. For example, we have been using the samples provided by different resources, but due to the different collection protocol they used, the quantification of those markers could be quite different, so that's really something we should address in the front of the biomarker evaluation. Other than that, we also need more biomarkers and to provide more personalized solutions for patients.

Dr. Doghramji:

Well, looking ahead, what do you think are the next steps for you and your colleagues to keep the momentum going here?

Dr. Hu:

The next goal for this project is to incorporate the biomarker profiling with the nanoplasmonic detection assay for the rapid clinical

translation, and we look forward to seeing such assay function well in the clinical trials. And so to keep this momentum, of course, is patients, and whenever we think about the patients and how to enhance their life quantity, that's always our momentum as a research scientist.

Dr. Doghramji:

Well, on that encouraging note, I want to thank my guest, Dr. Tony Hu, for walking us through this promising line of research which hopes of adding the first serum biomarker to the fight against non-small cell lung cancer. Dr. Hu, it was great having you on the program today.

Dr. Hu:

Thank you so much.

Announcer

You've been listening to Closing the Gaps in Non-Small Cell Lung Cancer, sponsored by Lilly. To access other episodes of this series, visit [ReachMD/NSCLC](#), where you can be part of the knowledge.