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Multiplex Proteomic Biomarkers in MS: Emerging Tools for Precision Care

ReachMD Announcer:
You're listening to *NeuroFrontiers* on ReachMD. On this episode, Dr. Raphael Schneider will discuss the role of multiplex proteomic biomarkers in multiple sclerosis management, which he spoke about at the 2026 ACTRIMS Forum. Dr. Schneider is a neurologist and researcher at the BARLO MS Centre at St. Michael's Hospital as well as an Assistant Professor and the Elizabeth S. Barford Early Career Professor in Multiple Sclerosis in the Department of Medicine at the University of Toronto. Let's hear from him now.

Dr. Schneider:
Multiplex proteomic biomarkers measure many proteins at once in a single sample. The sample can be, for example, serum or plasma, or it can be spinal fluid in the case of neurological diseases. And the idea is to get a signature, so to speak, rather than just to establish a level of one single protein.

In MS, for example, these panels aim to reflect biological processes that are related to inflammation, neuronal damage, or activation of glial cells in the brain. And the interesting thing about multiplexing is that you can measure multiple pathways in one sample. This really opens the door to better understanding the underlying biology that could be driving what's going on because we are always interested in seeing how our patients are doing today and what their prognosis may be. And that may be linked to, yes, a single biomarker, but it's more likely that it's related to an underlying process that is better defined by using multiple different proteins to establish that type of signature.

There are basically two ways of designing these studies; it's either cross-sectionally or longitudinally. Cross-sectionally, people have looked into these multiplex biomarkers at one point in time and then have tried to make links with what was going on that very moment—was the patient having a relapse, for example, or was there some activity on the MRI? And then they try to make that link. What's a bit more interesting are longitudinal studies because what we want to get at is a marker that tells us today what may be happening in six months or maybe in two years. It gives us a broader picture—a view into the biology that's underlying the disease.

Going back to this idea about studying inflammation or damage, that may be really quite interesting, specifically in the context of MS, because we know that with inflammation, we may be able to suppress with certain medications. But it's much more challenging to work on neurodegeneration, where we really share the same concerns people have that are working in the field of Alzheimer's disease, for example, or Parkinson's disease, where options to treat are really limited. So, when using multiple biomarkers, giving us this additional picture into the neurodegenerative processes is really one of the major advantages. One could say, "Well, a single biomarker, like neurofilament, gives you something similar," but the problem with neurofilament is that it seems to be somewhat at the end of a pathway, so it really just tells you about damage. I'm particularly interested in, for example, what we could learn about proteins that are related to glial cells, which may be involved in both inflammation and also damage.

I think those are the advantages on the biological end. But I also think that when we're going back to the patient, a multiplex biomarker or biomarker panel may tell you something about how two people who are different but look very similar to the clinician. So, two people may walk in: person A and person B. They're a similar age; they have similar imaging findings. But the multiplex biomarkers show you that there's something different about these two. And so that may help you stratify people, and yes, on the one hand, it may help you in the clinic to say, "This and that, may be happening to you," but we often use stratification when we think about additional research studies. So, a certain individual with a certain biomarker profile, so to speak, based on multiplexing, may be in a certain risk group. And that can help us guide more research questions, maybe even when it comes to clinical trials to stratify people based on how the multiplex panel looked.

ReachMD Announcer:
That was Dr. Raphael Schneider discussing multiplex proteomic biomarkers in multiple sclerosis care. To access this and other episodes in our series, visit *NeuroFrontiers* on ReachMD.com, where you can Be Part of the Knowledge. Thanks for listening!