Transcript Details

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Emerging Biomarkers for Remyelination in MS: From Fluid Markers to Imaging

Announcer:
You're listening to *NeuroFrontiers* on ReachMD. On this episode, we'll hear from Dr. Ahmed Abdelhak, who's an Assistant Professor of Neurology at the University of California, San Francisco. He'll be sharing key takeaways from his session at the 2025 Consortium of Multiple Sclerosis Centers Annual Meeting, which focused on emerging serum and imaging biomarkers to monitor remyelination in multiple sclerosis. Here's Dr. Abdelhak now.

Dr. Abdelhak:
There have been a lot of work groups trying to define various markers to detect myelin injury and remyelination, and if we think about body fluid markers for that, we so far did not have any direct tool that can reflect myelin injury with high precision that is also very well validated in people with MS. There are some older markers that can detect myelin injury, but that doesn't really tell you a lot about remyelination.

So part of the work that I have been involved in is trying to use some of the already established markers—for example, neurofilament light chains, a marker of axonal injury—to understand how changes in the myelin sheaths might impact the structure of the axons, and therefore, you can indirectly and in the right context use NfL as a marker of remyelination. For example, in the ReBUILD trial, which is a clinical study looking for the effect of clemastine—an FDA-approved antihistaminic that has been shown in vitro setting to be a potent promoter of remyelination—people with multiple sclerosis received clemastine over a short period of around three months, and what we end up seeing is that those patients who were exceptionally stable on disease-modifying treatment didn't have any disease activity and had lower levels of neurofilament light chains at the end of the trial after they had been treated with clemastine. So we conducted numerous studies in the lab using different animal models and samples from people with multiple sclerosis from different cohorts to show that just by demyelinating the axons, NfL levels would go high, and by remyelinating the axons, NfL levels would get lower. So this is an indirect marker of de and remyelination.

Another marker that is currently quite interesting is MOG. So MOG is a myelin protein, and we have some of the new proteomic-based approaches that allow us to measure MOG levels in the blood and can give us a more targeted view on the changes that are happening to the myelin. However, the potential of MOG as a myelination marker is not yet completely defined. But the same tools that allow us to measure MOG at that time being—those proteomic-based approaches—are currently being used to define a very broad set of direct and indirect remyelination markers, and we presented some of those during our presentation at CMSC. Those are the body fluid biomarkers.

For the imaging markers, we have also a couple of promising tools. We have new PET tracers that are more myelin specific. We have some MRI sequences, like myelin water fraction, that have been validated in tissue using samples from people with multiple sclerosis and using different animal models, which have showed they reflect changes in the myelin structure with an acceptable sensitivity and specificity. And all of those are very promising tools that are expanding our arsenal of biomarkers of remyelination at the time being.

One important thing I would like to highlight following our presentation at CMSC is that remyelination is achievable, and it's one of the main areas MS research is focusing on now. It's critical for neuroprotection. It's potentially helpful for restoration of function. And finally, we are starting to have different tools that can help us measure this remyelination in people with multiple sclerosis.

At the time being, it's mostly of interest for people who are designing clinical trials for remyelinating drugs. You have this wide arsenal of tools that you can use to prove that this drug works, but some of those tools are accessible in the clinical setting—for example,

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neurofilament light chain—and when we are using them or starting to use them in the clinical setting, we have to understand that changes in myelin integrity might affect neurofilament light chain. So we don't even necessarily consider any NfL innovation now to be a sign of irreversible damage to the axons, but actually, just by changing in the myelin sheath, which is irreversible, you can see NfL levels changing. So just be cautious when you are interpreting that data from those biomarkers in the clinical setting, and consider the right context of use in the clinical setting and clinical trials.

Announcer:
That was Dr. Ahmed Abdelhak talking about emerging serum and imaging biomarkers to monitor remyelination in multiple sclerosis, which he discussed at the 2025 Consortium of Multiple Sclerosis Centers Annual Meeting. 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!

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