

LECTURE

Prof Heinz Wiendl

05.11.2025

 LIH Edison, rooms Curie-Pasteur
1A-B, rue Thomas Edison,
L-1445 StrassenL, Luxembourg 11:00 - 12:00

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Compartment specific phenotyping of neuroimmunological diseases: towards a biology driven framework of disease classification.

Neuroimmunological diseases, such as multiple sclerosis, have seen tremendous progress in recent years — not only in terms of pathological understanding and diagnostic criteria, but also in therapeutic management. However, a major challenge remains: current diagnostic, prognostic, and therapeutic approaches are often not rooted in true biological determinants. Moreover, therapeutic strategies remain largely immune-focused, without adequately addressing the biological heterogeneity of these diseases.

This talk outlines our strategic efforts to define neuroimmunological diseases within a more biology-driven framework. Central to this approach is compartment-specific phenotyping, with a particular focus on the cerebrospinal fluid and peripheral blood.

We have identified three distinct peripheral immunological endophenotypes, each associated with different disease trajectories and personalized treatment implications (Groß et al., Science Translational Medicine, 2024). However, characterizing disease progression — and identifying reliable surrogate markers — remains a greater challenge. (Ostkamp et al, Science Translational Medicine, 2021).

Most recently, we applied a novel, agnostic machine learning approach to redefine multiple sclerosis as a set of dynamic disease states, rather than relying on fixed phenotypic categories (Ganjgahi et al., Nature Medicine, 2025).

Altogether, this evolving framework aims to more accurately capture the biological heterogeneity of neuroimmunological diseases — ultimately improving individual prognostication and therapeutic decision-making.

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