

Sunrise Translational Pathways & Validation course

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Highlights:

- Molecular biology validation may turn your MRI interpretation up side down
- Pitfalls to avoid when starting out as a novice

There's more than meets the eye: interpreting you MR images using molecular biology

When developing MRI techniques, or using MR methods in new application, the question arises what the exact physiological or pathological substrate is of the obtained MRI contrast. In that case, research using animal models or post-mortem brain specimens can provide the opportunity to validate the MRI findings using gold standard histological and molecular biology techniques.

This presentation will focus on the most commonly used techniques, such as immunohistochemistry, Western blots and Elisa essays, and explains the principles of the methods in the context of MR research. Secondly, examples will be shown of cases where molecular biology played an essential role in interpreting the MRI findings. Lastly, attention will be given to special methodological considerations necessary to avoid interference between the techniques. One example of particular interest for MRI research is the possibility of false positive immunohistochemistry due to the presence of iron oxide contrast agents.

Literature:

den Adel B, Bovens SM, te Boekhorst B, Strijkers GJ, Poelmann RE, van der Weerd L, Pasterkamp G. Histological validation of iron-oxide and gadolinium based MRI contrast agents in experimental atherosclerosis: the do's and don't's. *Atherosclerosis*. 2012 Dec;225(2):274-80.

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van Duijn S, Nabuurs RJ, van Rooden S, Maat-Schieman ML, van Duinen SG, van Buchem MA, van der Weerd L, Natté R. MRI artifacts in human brain tissue after prolonged formalin storage. *Magn Reson Med*. 2011 Jun;65(6):1750-8.

Nabuurs RJ, Hegeman I, Natté R, van Duinen SG, van Buchem MA, van der Weerd L, Webb AG. High-field MRI of single histological slices using an inductively coupled, self-resonant microcoil: application to ex vivo samples of patients with Alzheimer's disease. *NMR Biomed*. 2011 May;24(4):351-7.