

What Life Scientists Should Know About Molecular Imaging

MR Fundamentals for Life Scientists

Introduction to MR Hardware

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Learning Objectives:

- The basic principles of MRI RF-coil function the main facts in SNR optimization
- Different application adapted coil designs
- The issues when reducing coil sizes towards animals and microscope

This lectures aim is to give an overview on RF coils in MRI. It will cover the basic physics of LC circuits in strong magnetic fields, the principles of sample excitation and signal reception as well as issues determining and optimizing the achievable SNR. The most common coil geometries including phased arrays with their design trade-offs, advantages and limitations for specialized applications will be introduced. Furthermore, the miniaturization of MRI RF-coils from man to mouse and further to MR microscopy will be discussed in terms of design and SNR optimization.