Developing Imaging techniques and novel animal models to answer research questions.

Miriam Scadeng, MD

Associate Professor and Associate Director for High Field and Small Animal MRI,
Center for Functional Magnetic Resonance Imaging (fMRI),
UCSD
Developing Imaging techniques and novel animal models to answer research questions.

- Microimaging of zebrafish models,

- Development of melanin as an endogenous MRI reporters for stem cell and tumor and oncolytic virus tracking

- Methods for murine lung MR imaging by removing tissue/air susceptibility

- Penguins lung and airsac morphology in understand prevention of barotrauma

- Barheaded geese (fly over the Himalayas) to understand hypoxia tolerance and efficient gas exchange design
Move away from rodent models to more relevant species

- Dolphins are large complex animals much like human.
- US Navy identified gene that switches on metabolic syndrome
- Potential to control type2 diabetes

Imaging Brain inflammation

- Extracellular fluid from the CSF space flushes the brain of metabolic debris, amyloid.
- Occurs largely during sleep.
- This is reduced in many neurodegenerative diseases: Alzheimer's disease, TBI, HIV, drug abuse, and as we age.
- Likely due to elevated neuro-inflammation: neurotransmitter and calcium accumulation resulting in neuronal excitotoxicity.

- Imaged this in guinea-pig model.
- Developing new MR based techniques to visualize this process in rats, humans, and also in dolphins and bird models which are unique as they demonstrate uni-hemispheric sleep.

Medical Education

- Basic and advanced radiology electives for medical students
- 3D virtual human project