



fMRI-BASED QUANTITATIVE MAPPING OF HUMAN BRAIN CEREBROVASCULAR AND METABOLIC FUNCTION

A TALK BY

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**SEMINARIO
IN MODALITA'
TELEMATICA**

In the last 30 years blood oxygenation level dependent (BOLD) fMRI has taught us a great deal about human brain organisation. However, it only tells us where brain activity is changing without telling us by how much or what the baseline level of activity is. We and others are working on fMRI methods to map the absolute rate of cerebral metabolic oxygen consumption as a marker of the physiological state of brain tissue in health and disease. Development of these methods has resulted in a toolkit for assessing oxygen consumption and cerebrovascular function (including vascular reactivity and arterial compliance) that is yielding interesting results in our pilot clinical studies in epilepsy and multiple sclerosis and in the study of the healthy brain. These approaches have the potential to take fMRI to a new level of quantification of brain function required for experimental medicine and future clinical application.



RICHARD WISE is a physicist who has always worked at the interface of physics and physiology. He specialised in cardiovascular magnetic resonance imaging for his PhD at Cambridge University. In 2000 he changed from imaging the heart to the brain with a move to Oxford University as a post-doctoral research fellow, (Wellcome and MRC research fellowships). From 2006 he developed his research group at Cardiff University Brain Research Imaging Centre with a focus on understanding drug effects on human brain function and looking for ways to quantify brain function using functional MRI approaches, based on sensitivity to blood oxygenation in the human brain. This has led recently to a new magnetic resonance imaging toolkit with the possibility to interrogate, in detail, the function of brain blood vessels and to measure the amount of oxygen fuel that the human brain is using in health and disease. At the end of 2019 he moved to ITAB (Institute of Advanced Biomedical Technologies) and the Department of Neuroscience, Imaging and Clinical Sciences at the University of Chieti-Pescara in Italy, as full professor of applied physics (Professore Ordinario - chiamata diretta).



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