



Tissue oxygenation mapping by combined chemical shift and T1 magnetic resonance imaging

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Titre	Tissue oxygenation mapping by combined chemical shift and T1 magnetic resonance imaging
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Mots-clés	Brown Adipose Tissue [5], chemical shift imaging [6], fat fraction [7], longitudinal relaxation time [8], Magnetic Resonance Imaging [9], Oxygenation [10] Purpose: To propose a method for determining tissue oxygenation via the measurement of fat T1. The method is based on a 2D fat/water chemical shift-encoded and T1-weighted acquisition. Theory and Methods: A 2D data set was acquired with a fast spin echo sequence with several echo asymmetries and repetition times, wherein one dimension is related to the fat/water phase modulation and the other to the T1 saturation recovery. A joint magnitude-based process of phase modulation and T1 evolution allowed for the collection of the fat fraction and T1 maps with resolved fat or water dominance ambiguity while avoiding the phased error problem. Results: In vitro imaging allowed for the attribution of fat content for different water/oil emulsions that demonstrated longitudinal relaxation rate (R1) sensitivity to the oxygenated emulsion environment. The fat R1 values were subsequently compared to reference values, which were measured using low receiver bandwidth acquisition to enhance water and fat signal separations. In vivo feasibility of tissue oxygenation assessment was demonstrated by investigating interscapular brown adipose tissue modifications during an air/carbogen challenge in rats. Conclusion: The proposed method offers a precise and robust estimate of tissue oxygenation illustrated by the method's ability to detect-brown adipose tissue oxygenation modifications.
Résumé en anglais	
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Liens

- [1] <http://okina.univ-angers.fr/f.franconi/publications>
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- [4] <http://okina.univ-angers.fr/patrick.saulnier/publications>
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