



## FENS Forum - Abstract

## ABSTRACT CONFIRMATION

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 Date: 1st submitted, 31/01/2008, last edition, 19/02/2008, 11:47:27.

Abstract n° : 096.17  
 Ref.: FENS Abstr., vol.4, 096.17, 2008

Authors	Mishra A., Schüz A., Dhingra K., Logothetis N. K. & Canals S.
Addresses	Max Planck Institute for biological Cybernetics, Tuebingen, Germany
Title	Development of biocytin-based contrast agents for molecular imaging: an approach towards new in vivo neuroanatomical tracers.
Text	<p>Biocytin is a widely used anterograde and retrograde neuroanatomical tracer. Due to its high affinity towards avidin, it can be visualized by using a host of avidin-conjugated markers at the electron microscopic level. Here we report the synthesis of the multimodal neuronal tracers that can be visualized by electron microscopy as well as by magnetic resonance imaging (MRI) in living animals, thus allowing longitudinal brain connectivity studies in vivo, followed by postmortem subcellular investigations. We have designed and synthesized three novel and structurally different gadolinium (Gd<sup>3+</sup>) containing biocytin-based neuroanatomical tracers (L1-L3). L1 contained amide linkage between amine of GdDO3A-EA and carboxylate of biocytin. L2 consist of a novel precursor based on serine containing Gd-DO3A which has 1° amino group as well as a carboxylate group available for binding. 1° amino group has been used to form amide bond with acid group of biotin while its carboxylate group has been linked to alpha amino group of l-lysine via amide bond. Newly developed modified biocytin (MB) consisted of propylamine linked to the amide bond in biocytin. L3 is derived from newly developed MB where propylamine is linked to amide of biocytin giving the possibility to couple Gd-DOTA as MRI marker.</p> <p>In vitro MR experiments with increasing concentrations of avidin were performed at 7T. The r2 for L1-L3 (300%, 80% and 100% respectively) demonstrated strong binding of all tracers in the pocket of tetrameric avidin through biotin. By replacing Gd-DOTA with FITC in L3, the efficiency of cell internalization was demonstrated microscopically with fluorescence methods. In vivo experiments with L3 demonstrated an increased molecular stability compared with regular biocytin and excellent neuronal tract-tracing capabilities.</p> <p>Our results suggest that the class of biocytin-based and Gd-containing molecules described here, represents a new and powerful strategy for neuroanatomical.</p>
Theme 1	Techniques, history and teaching Neurotechniques None
Theme 2	Development Brain patterning None

Session: P096 - Techniques 2  
 Date: 14/07/2008, 09:30:00 - Hall 1  
 Reference: Poster G17

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