In vitro and in vivo validation of hydrogel-coated l-glutamate microsensors

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Introduction. L-glutamate is the predominant excitatory neurotransmitter in the central nervous system and involved in many physiological pathways. Microdialysis is the most frequently used technique to monitor extracellular glutamate levels *in vivo*. However, the neuronal origin of glutamate in microdialysates is questioned, as its origin does not fulfill the classical release criteria (1). Biosensors seem promising in detecting neuronal glutamate levels. Several types of glutamate-biosensors have been developed, each with specific features. The biosensor concept used in this study is a carbon fiber electrode (CFE) based on a hydrogel trienzym osmium-redox-polymer coating (2).
Materials and Methods. Glutamate biosensors are prepared by coating a CFE (diameter: 10 µm, length: 350-450 µm) with a hydrogel in which glutamate oxidase, horseradish peroxidase and ascorbate oxidase are cross-linked with PEDGE to an osmium-redox-polymer (2). A Nafion coating applied on the hydrogel finishes the construction.
Results and Discussion. Due to its specific design, the microsensor has several advantages and seems promising in detecting neuronally derived glutamate(2). However, a drawback of this design is the complexity of the construction. To obtain reliable results, it is necessary that the microsensor has reproducible characteristics. In order to produce uniform sensors much attention was paid to optimize its construction (3).
The microsensor is now in the process of validation. An important aspect is how the microsensor behaves *in vitro*, e.g. in brain slice cultures, and *in vivo*.
During the presentation results of *in vitro* and *in vivo* experiments will be presented.

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