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Introduction

A method has been developed for improved time resolution in on-line microdialysis. The method was developed for analysing responses such as neurotransmitter release that take place within 30 minutes. Conventional microdialysis sampling once every 10 or 20 minutes is not enough to describe the release accurately. Analysis of dopamine (DA) and serotonin (5-HT) with 3 minute time resolution has been achieved.

The microdialysis perfusate fills the three injection loops. After filling the analysis is started by switching the valve and injecting simultaneously onto three parallel columns. After injection the valves are switched back to load and the process is repeated. During analysis the loops are being filled.

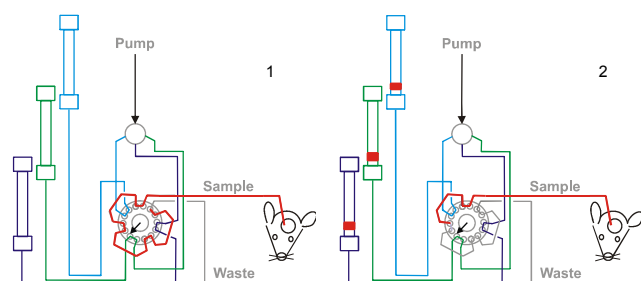
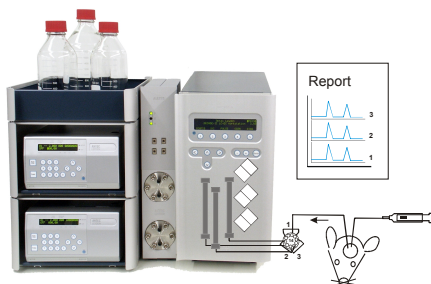


Fig. 1. On-line microdialysis sampling. Three parallel 50 x 1 mm HPLC columns are used for fast analysis of neurotransmitters. Analysis and loading of subsequent sample occurs simultaneously.



Method

An ALEXYS 100 LC-EC system is used with three LC columns in parallel. The DECADE II™ electrochemical detector has a TCC configuration (Triple Cell Control). The system was evaluated for analysis of dopamine and serotonin. Only one HPLC pump is used equipped with a 4 port splitter connected to three columns.

HPLC	ALEXYS OMD Time Resolution (pn 180.0083A)
Flow rate	150 µL/min (splitted, 50 µL/min per LC system)
Injection	2 µL, 3 loops in series
T oven	35 °C (separation and detection)
ADF™	0.05 Hz
I cell	15 pA

Results

The experimental results are obtained by sampling from a chromatographic profile at 1 µL/min, which simulates a microdialysis setup sampling a fast neurochemical response. The 'perfusate' is sampled and injected every 10 minutes.

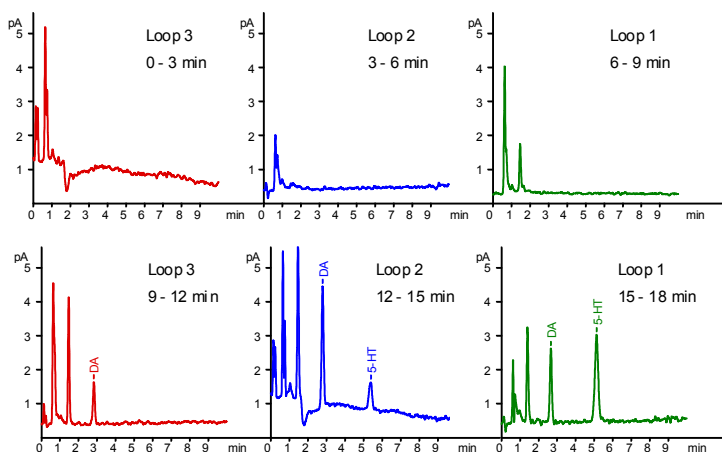


Fig. 3. Chromatograms of two subsequent analyses with three columns in parallel. The first traces (top left) show the start, without peaks. After 9 minutes the first peaks appear.

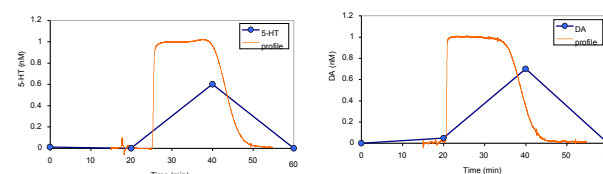


Fig. 4. Conventional microdialysis sampling, once every 20 min.

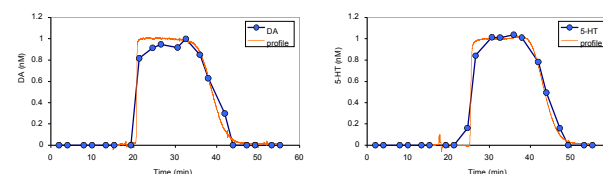


Fig. 5. New sampling method with 3 min time resolution for more accurate description of simulated microdialysis profile.

Conclusion

A method has been developed for improved time resolution in on-line microdialysis for analysing responses such as neurotransmitter release that take place within 30 minutes. The method describes the release more accurately than the conventional method of analysing once every 20 min.