INTRODUCTION
The study of neurotransmitter levels in brain remains an analytical challenge, despite significant improvements over the years. Concentrations of some neurotransmitters from particular brain regions are close to the detection limit of current analytical methods, and to increase time resolution there is a demand to measure in ever smaller sample volumes. Any improvement that can enhance the detection sensitivity are therefore relevant.

Antec had developed the SenCell™ a new electrochemical flow cell for UHPLC with ECD. The SenCell with its optimized confined well design shows considerable improvements in signal-to-noise characteristics, which makes the cell very well suitable for ultra-trace analysis of neurotransmitters in dialysates and brain homogenates. The superior performance and novel functionality of the new SenCell is demonstrated with some examples.

FEATURES
The new SenCell has several unique features (Patent pending):

- Compact Size (diameter 38 mm, Height 32 mm)
- Toolless Assembly of Flow Cell
- Easy-tick screw connection
- Spacerless Concept (No cumbersome polymeric/metal spacers required)
- Stepless Adjustable Working Volume (Tunable response, high sensitivity, superior S/N ratio)
- Fast Noise Stabilization
- Leak-free up to 25 Bar (Drying sealing)
- Ease of Use and Maintenance

SENCELL VERSUS VT-03
To demonstrate the excellent performance of the new electrochemical flow cell a SenCell with a 2 mm Glassy Carbon working electrode (WE) was compared to an Antec VT-03 flow cell with identical WE diameter and the signal and noise evaluated (see figure 3). The VT-03 was equipped with a 25 µm FEP spacer, the SenCell was set to an optimum spacing of approximately 10 µm which corresponds to a cell working volume of 30 nL.

The SenCell in this example showed:
- Signal factor 1.5 – 2 Higher!
- Noise factor 3 lower!

TUNING OF DETECTION PERFORMANCE
The SenCell design eliminates the use of cumbersome spacers. The working volume of the electrochemical cell can be steplessly adjusted without opening the cell by means of an special adjuster tool, allowing easy optimization of the detection sensitivity for any LC application. The spacing between inlet and working electrode can be tuned between roughly 0-100 µm resulting in excellent performance in ultra-trace analysis.

SPECIFICATIONS
- Dimensions: 38 mm diameter, 32 mm height
- Working electrode: Glassy Carbon
- Spacing: 10 µm to 100 µm
- Working volume: 30 nL
- Noise: < 50 pA
- Response time: < 1 minute

CONCLUSIONS
- The SenCell with its unique compact design combines ease of use (toolless assembly, spacerless) with the ability of stepless tuning of the cell working volume between 0 - 300 nL to optimize the S/N ratio.
- The SenCell under test showed significantly better signal-to-noise characteristics. Up to factor 4 - 6 improvement in S/N ratio was observed compared to an amperometric flow cell with an identical working electrode diameter (VT-03).

DIALYSES
Examples of Dialysate chromatograms (5 µL injections) recorded with the SenCell in combination with the ALEXYS Neurotransmitter analyzer, UHPLC.

FAST STABILIZATION
After installation and electrochemical activation (10 minutes pulse form ECA to E1) the SenCell background current stabilizes after a short period of time allowing trace analyses after approximately 4 hours waiting time.

UHPLC
The SenCell is capable to detect fast temporal responses and is therefore suitable for UHPLC applications.

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