

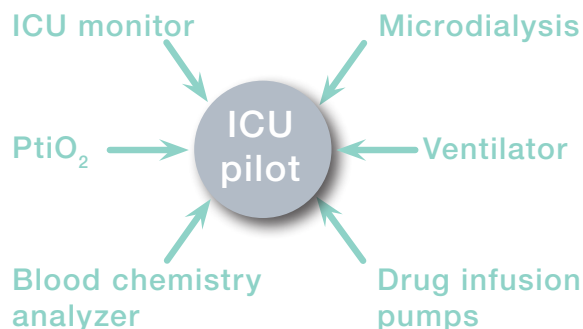
Consensus from expert panel & software for Multimodal Monitoring

The Consensus paper (Hutchinson et al. Intensive Care Med. 2015) from the International Microdialysis Forum meeting in Cambridge includes; experts guidance for use of microdialysis in traumatic brain injury and subarachnoid hemorrhage, catheter location, reference values and interventions. Find below a few conclusions from the paper:

- Low brain Glucose is associated with unfavorable outcome.
- An increase in the Lactate Pyruvate (LP) ratio in the presence of low Pyruvate (and low oxygen) indicates ischemia.
- An increase in the LP ratio in the presence of normal or high Pruvate (and normal oxygen) indicates mitochondrial dysfunction.
- A high LP ratio is associated with unfavorable outcome.

ICUpilot - software for multimodal monitoring

ICUpilot is a unique tool for multimodal monitoring in the ICU. Bedside Patient Monitors (showing e.g. blood pressure, pulse, ICP, CPP) as well as the Microdialysis Analyzer can be connected to a separate computer for on-line analysis and comparison of all data collected bedside during the entire care of the patient.



Literature:

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Implementation of cerebral microdialysis at a community-based hospital: A 5-year retrospective analysis. Surg Neurol Int. 2012 Chen et al. Legacy Emanuel Medical Center, Portland, USA.

Cerebral extracellular chemistry and outcome following traumatic brain injury: a microdialysis study of 223 patients. Brain. 2011 Feb; Timofeev et al. University of Cambridge, Addenbrooke's Hospital, Cambridge, UK.

Delayed neurological deficits detected by an ischemic pattern in the extracellular cerebral metabolites in patients with aneurysmal subarachnoid hemorrhage. Journal of Neurosurgery 2004. Jane Skjoth-Rasmussen et al. OUH, Odense Denmark

Cerebral Microdialysis Monitoring to Improve Individualized Neurointensive Care Therapy: An Update of Recent Clinical Data. Oddo M et al, Front Neurol. 2017. CHUV Lausanne, Switzerland

Characterising the dynamics of cerebral metabolic dysfunction following traumatic brain injury: A microdialysis study in 619 patients. Guilfoyle MR, Helmy A, Donnelly J, Stovell MG, Timofeev I, Pickard JD, Czosnyka M, Smielewski P, Menon DK, Carpenter KLH, Hutchinson PJ. PLoS One. 2021 Dec 16. University of Cambridge, Addenbrooke's Hospital, Cambridge, UK.

Brain microdialysate tau dynamics predict functional and neuro-cognitive recovery after poor-grade subarachnoid haemorrhage. Helbok R et al. Brain Commun. 2023 Jan 2. Innsbruck Medical University Hospital, Austria.

M Dialysis AB

M Dialysis AB is the leading company devoted to the development, manufacturing and marketing of the Microdialysis technique.

The head office is located in Stockholm, Sweden, with a subsidiary in Boston MA, USA. M Dialysis has distributors across the globe, responsible for local

μ dialysis

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Microdialysis

Advanced monitoring in neurointensive care

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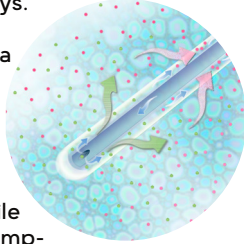


μ dialysis

Microdialysis in Neurointensive Care

Microdialysis is a tool for in vivo sampling of soft tissues that utilizes the principle of diffusion through a semi-permeable membrane. The technology is minimally-invasive, easy to handle, and may be used for several days.

The method is performed by inserting a Microdialysis catheter into the tissue being studied. The Microdialysis membrane of the catheter is in direct contact with the soft tissue.



The catheter is perfused with a sterile isotonic solution via a small syringe pump-attached to its inlet lumen.

In the tissue, substances from the interstitial fluid diffuse through the semi-permeable membrane into the perfusion fluid. This fluid, now known as dialysate, flows through the outlet lumen and into a collection Microvial. Microvials are exchanged at regular intervals. The dialysate collected may be analyzed immediately using the ISCUS^{flex} Microdialysis Analyzer as well as later in the laboratory using additional analytical techniques (if desired).

The microdialysis values provide a picture of the local tissue metabolism. This has been particularly useful in neurointensive care as there are well described metabolic changes that occur with secondary ischemic events in the cases of traumatic brain injury (TBI) and subarachnoid hemorrhage (SAH).

Secondary ischemia is a frequent and serious complication affecting patient outcome. Since Microdialysis allows continuous surveillance of cerebral metabolism in a clinical setting, secondary ischemia or mitochondrial dysfunction can be recognized at an early stage. Thus, the technique opens a window of opportunity for therapeutic interventions.

Microdialysis sampling

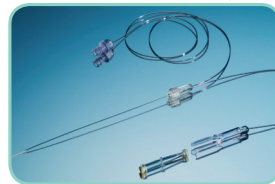
Microdialysis sampling is carried out by placing the sterile CE-certified Microdialysis catheter in the brain parenchyma. All Brain Microdialysis Catheters have a gold thread in the tip so confirmation of placement can be made by CT.

70 Brain/71 High Cut Off Microdialysis Catheter



- Free positioning and fixation by tunnelation
- 20or 100 K Dalton cut off dialysis membrane
- Available in different lengths of shaft and membrane

70 Bolt /71 Bolt High Cut Off Microdialysis Catheter

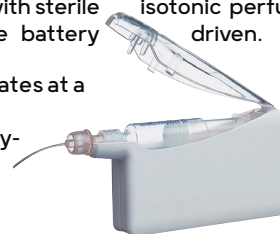


- Access and fixation using a bolt system
- 20or 100 KDalton cut off dialysis membrane

106 and 107 Microdialysis Pump

The 106 and 107 Microdialysis Pumps are dedicated for the perfusion of Microdialysis catheters with sterile isotonic perfusion fluid CNS. Both pumps are battery driven.

The 106 Microdialysis Pump operates at a fixed flow rate of 0.3 $\mu\text{l}/\text{min}$. The flow rate of the 107 Microdialysis Pump can be set stepwise between 0.1 and 5.0 $\mu\text{l}/\text{min}$.



ISCUS^{flex} Microdialysis Analyzer

The ISCUS^{flex} Microdialysis Analyzer is specially designed to handle collected Microdialysis samples with low sample volumes. It is a point of care analyzer for monitoring of metabolic changes in tissues and organs during surgery, intensive care and normal ward.

Biochemical markers:

Glucose

Lactate

Pyruvate

Glycerol

Glutamate

Urea

LP-ratio



The ISCUS^{flex} Microdialysis Analyzer is easily operated by medical professionals and clinical researchers. It provides unique opportunities for early detection of metabolic crisis, ischemia and to guide post-operative interventions. Data is displayed as trends for simple and fast interpretation.