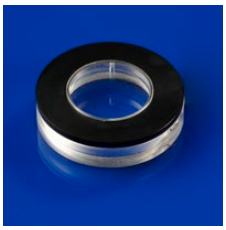
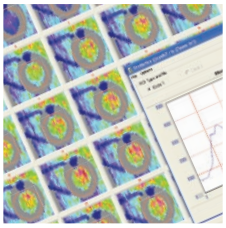
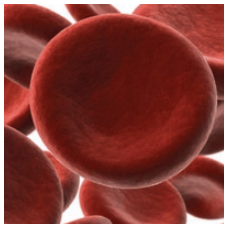
Transdermal drug delivery

with moorVMS-ION







moor instruments

innovation in microvascular assessment

moorVMS-ION - Iontophoresis Controller

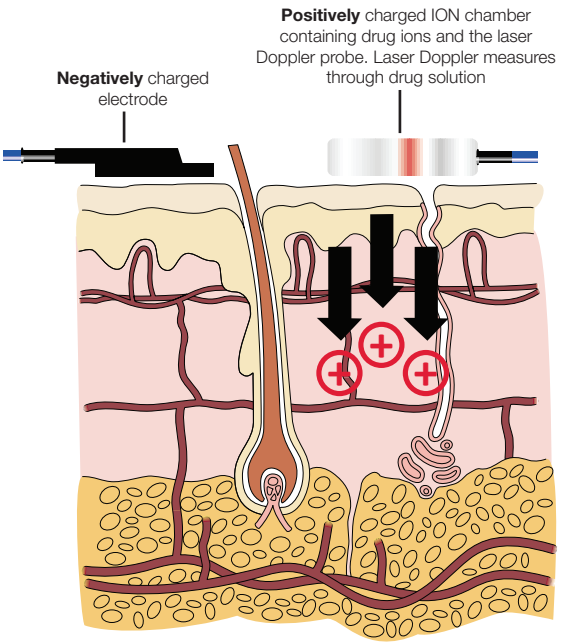
Iontophoresis, in combination with blood flow imaging and monitoring, is a convenient method of delivering precise doses of vaso-active drugs into the skin and assessing the response. Challenges are measured, reproducible and enable the study of endothelial dysfunction (a marker in predicting microvascular disease) and in tracking progress of treatments. Benefits of moorVMS-ION include;

- **Uncover more** by studying endothelium dependent and independent vasodilation at the same time with a dual chamber configuration. Study smooth muscle function, responses to treatment, diet and exercise, irritancy and peripheral neuropathy.
- **Easy set up and full compatibility assured** with other moorVMS-family products, (including laser Doppler, tissue Oxygen, skin heating and pressure cuff protocol products) as well as Moor blood flow imaging systems.
- **Easily emulate published** protocols and generate reports with multiple programmable current levels and delivery periods with moorVMS-PC monitoring software. Flexible report setup for easy analysis.
- **Minimise study costs** with re-usable drug chambers.
- **Reliability** 3 year manufacturers warranty as standard.
- **Benefit from our knowledge and expertise** – ask for advice and references.

moorVMS-ION and ION1r chamber – Experimental set-up.

The Technique

Iontophoresis is a method of delivering ionic drugs into the skin. Normally non-lipophylic drugs, e.g. acetylcholine chloride, would remain on the skin surface and very little would diffuse into the skin. By applying a low voltage to a drug solution, the ions of the drug conduct electricity as they pass into the skin. Changes in skin blood flow can be assessed by laser Doppler monitoring or imaging.



The electric field at the ION chamber repels the drug ions which are forced through the surface of the skin. For negatively charged drugs, the ION chamber is attached to the negative terminal of the supply.

Use of low current doses (usually less than 50 microamps) has been shown to help eliminate non-drug related vasodilation due to the galvanic effect (vasodilation resulting from the passage of current through the skin). The moorVMS-ION has been specifically designed to operate at low current settings with an accuracy of 0.1 microamps and is a constant current system – i.e. the applied voltage varies according to the skin resistance to keep current delivery as programmed. The moorVMS-ION measures both current and applied voltage and calculates skin resistance automatically.

Response Monitoring with the moorVMS-LDF

An ION chamber containing an ionic drug solution and a laser Doppler probe is attached to the forearm with a double sided adhesive disc. The ION chamber, together with a reference electrode (or second ion chamber) to complete the circuit, is connected to the moorVMS-ION. The moorVMS-ION is controlled either manually, or automatically with the moorVMS-PC software. The user defined protocol delivers the programmed drug doses to the skin. The laser Doppler monitor (usually with two probes) measures the response to the drug both at the delivery site and at a reference site, typically a few centimeters from the chamber. Results are displayed graphically and are easily analysed post measurement with moorVMS-PC software.

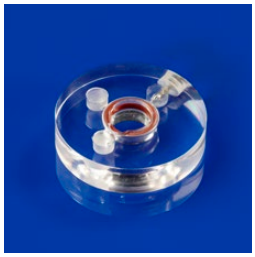
Reproducible Imaging

The procedure is similar to that of the moorVMS-LDF except larger ION6 chambers are normally used. Current and delivery period is set directly on the moorVMS-ION and the drug delivery started manually.

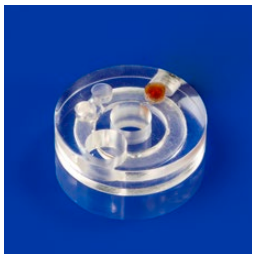
In repeat-scan mode, moorLDI scanning builds a series of colour-coded maps of the skin blood flow response. Full analysis of the changes in blood flow is available post scan.

moorFLPI-2 and moorVMS-ION – Experimental set-up displaying skin blood flow response to Acetylcholine. Laser Doppler imaging can also be used.

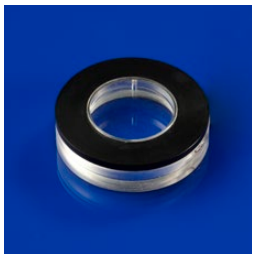
Ion Chambers



ION1r - perspex drug chamber which accepts Moor optic and skin heater probes. Drug chamber 9.5mm, overall diameter 36mm.



ION3-P2 - direct and indirect (axon reflex) assessment with moorVMS-LDF. For use with P2 optic probes. Drug chamber annulus internal diameter 14mm, outside diameter 22mm, overall diameter 30mm.



ION6 - is a drug chamber with a sealed cap to prevent drug spillage and a transparent window for LDI imaging. Drug chamber 22mm, overall diameter 36mm.

Multiple dose-response

Studies show that the cumulative dose responses have been found to be more reproducible than a single dose response. The moorVMS-PC (monitoring) software allows multiple time periods to be programmed to control the drug delivery automatically whilst measuring blood flow. This allows the use of protocols that would be difficult to perform manually thus improving experimental accuracy and reproducibility. Automation is carried through to analysis of the measurement.

About Moor Instruments

Moor Instruments, established in 1987, is a world leader in the design, manufacture and distribution of monitoring and imaging systems for micro-vascular assessments. We are proud now to include tissue oxygenation assessments within this portfolio.

Firsthand experience of laser Doppler research and development within Moor dates back to 1978 and with this we have the breadth of knowledge to help with your application and the enthusiasm to try and find answers to any of your questions.

By giving priority to performance, quality and service, we strive to ensure the highest levels of customer satisfaction.

Our dedicated design team is involved with a number of development projects for other partners and manufacturers. Whatever your needs, as a researcher, clinician or manufacturer, Moor will work harder for you.

moorVMS-OXY – tissue oxygen saturation, haemoglobin and temperature monitor with optional moorVMS-LDF laser Doppler monitor.

Specifications:

Quality Control
Moor Instruments is certified to ISO 13485: 2016.

Output Current Range
1 – 250µA.

Output Current Accuracy
Set current ± 0.5µA.

Output Current Step
0.1µA (<10µA), 1µA (>10µA).

Output Voltage (Maximum)
27V.

Resistance Measurement Range
1kΩ – 20MΩ .

Current Monitor Analogue Output
0-2.5V, 1V = 100µA*.

Voltage Monitor Output
0-2.7V, 1V = 10V*.

Sample Rate
40Hz all parameters.

General
Power source: Universal voltage, 100-230V AC, 30VA, 50 to 60Hz.
Dimensions: W x H x D mm, Weight: kg
moorVMS-ION: 235 x 60 x 200, 1.4kg.
Operating temperature: 15-30ºC.

Classification
Type of protection against electric shock: internally powered equipment.
Degree of protection against electric shock: Type BF applied parts.
Not suitable for use in an oxygen rich atmosphere.
Not suitable for use in the presence of flammable anaesthetics.

Moor Instruments reserves the right to change specifications without notice.

This product and its accessories are not for sale for use within the EU and UK.

*External equipment interfaces are electrically isolated from iontophoresis output.

moorVMS-ION – Easy set-up.

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innovation in microvascular assessment

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