

CULTURE MYOGRAPH SYSTEMS

Vascular research • Hypertension • Atherosclerosis • Diabetes • Pre-eclampsia •
Lymphatic transport • And more...



WIRE MYOGRAPH SYSTEM
PRESSURE MYOGRAPH SYSTEM
MUSCLE STRIP MYOGRAPH SYSTEM
TISSUE ORGAN BATH SYSTEM

CULTURE MYOGRAPH SYSTEMS - GENERAL

The Pressure and Culture Myograph Systems are used to measure the physiological function and properties of small arteries, veins and other vessels. The system also allows the study of the pharmacological effects of drugs and other vasoactive compounds on small isolated vessels under near-physiological conditions. In these systems the vessels retain many of their in vivo characteristics.

In pressure myography, an intact small segment of an artery or vein is mounted onto two small glass cannulae and pressurized to a suitable transmural pressure. This near-physiological condition permits the investigation of intrinsic (myogenic) responses which can be extrapolated to the in vivo behaviour of the entire vascular bed (autoregulation). Various pharmacological agents can then be studied by adding these to the superfusate or luminal solution. Both constriction and dilation can be readily measured as changes in diameter of the preparation via digital video edge-detection. Since intrinsic myogenic constriction is present, the role and function of the endothelium for this phenomenon can be studied.

Specialized versions of Pressure Myograph chambers can accommodate specific research needs like imaging (confocal) or electrophysiology. Pressure-based Culture Myographs are a new tool that provide long term tissue preservation to study molecular changes introduced via viral vectors, siRNA or other interventions. In this way, mechanistic and molecular physiological and pharmacological studies can be done on intact tissue under near-physiological conditions. Overall, the pressure myograph technique is a very powerful tool in the hands of the dedicated vascular physiologist or pharmacologist.

The following lists are a sample of the established areas of investigation for the Pressure Myograph Systems. In the future, many more areas will be added to these lists through design developments and research performed by myograph users.



Basic properties

- Small vessel function, vascular diameter
- Vascular smooth muscle function
- Vascular endothelium function
- Wall tension and thickness measurements
- Vessels isolated from animal or human
- Assessment of local vascular reactivity
- Assessment of flow mediated function

Vasoactive mechanisms

- Endothelium: role of endothelium-derived relaxing factor (NO), prostaglandins and endothelium-derived hyperpolarizing factor (EDHF)
- Smooth muscle: role of calcium and potassium and other ion channels
- Perivascular and intramural nerves: role of endogenous released transmitters

Pharmacology & pharmacotherapy

- Quantify the effect of treatment with, for example, ACE-inhibitors, statins, glitazones or insulin
- Receptor studies, localization and characterization of receptors
- Affinity and efficacy studies of vasoactive agonists and antagonists

Physiological changes

- Aging
- Pregnancy, pre-eclampsia

Pathology

- Hypertension
- Atherosclerosis
- Diabetes
- Ischemia heart disease and heart failure
- Tumours and angiogenesis
- Heart and lung diseases

Further possibilities

- Electrophysiological experiments (flexible electrodes)
- Fluorescence measurements of intracellular ions and other substances

CULTURE MYOGRAPH SYSTEMS - PRODUCTS

Culture Myograph Systems - 202CM & 204CM

The Culture Myograph Systems - 202CM and 204CM are designed to provide long-term functional preservation of small blood vessels by maintaining them under controlled culture conditions of intravascular pressure and flow. By using a closed, sterile system and standard culture methodology, vessels can be studied for several days.

The system has an integrated DMT microscope (with a USB CCD camera) for continuous monitoring of the vessel during the culture period. The system contains a stage with built-in heating and two reservoirs that are pressurized by an external pressure unit to maintain a consistent intravascular pressure.

The original 202CM model comes with one chamber stage whereas the 204CM is equipped with four chamber stages.

- **Provides long-term preservation of vessels >60 μm**
- **Built-in heating**
- **System includes integrated microscope with camera for continuous vessel monitoring**
- **Comes with MyoVIEW II to facilitate vessel monitoring during culture**
- **Possible to measure lumen size, wall thickness, cross-sectional area and other vascular parameters during culture**
- **The FlowMeter 161FM can easily be integrated to precisely control luminal flow**
- **Culture chamber easy to sterilize**



CULTURE MYOGRAPH SYSTEMS - ACCESSORIES

MyoVIEW II

MyoVIEW II is a improved software platform used in conjunction with DMT Pressure Myograph Systems.

The core function of the MyoVIEW II is to acquire diameter measurements from pressurized vessels. Flow measurements using the FlowMeter 161FM are now integrated into this single software package making it possible to do constant flow experiments. Other pertinent vascular-related data can now be easily obtained in MyoVIEW II without having to manually calculate parameters such as vascular resistance and shear stress.



FlowMeter - 161FM

The FlowMeter 161FM is based on novel CMOS technology that measures volume. Measurements from this meter, therefore, are more stable and accurate when compared to similar instruments used in vascular research. This precision instrument was designed for low-flow measurements (15 - 4000 $\mu\text{l}/\text{min}$) through tubular tissues such as arteries, veins and small ducts in studies under dual pressure control. The Flow-Meter is designed as an add-on option to all DMT Pressure Myograph Systems.



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