

LabChart: PV Loop Module

### All your analysis in one place

LabChart analysis software integrates all your data streams in one place. Designed specifically for life science data, LabChart provides up to 32 channels for data display, with automated or customizable analysis options.

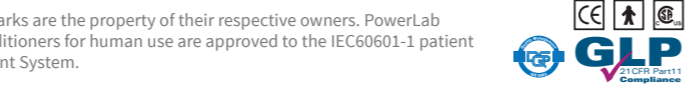
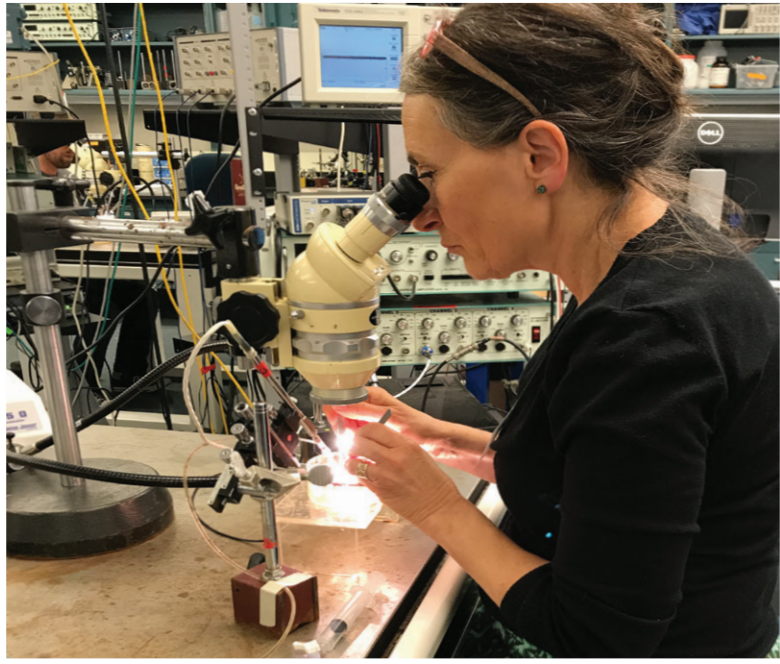
#### LabChart for Animal Hemodynamics

- Blood Pressure Module
- PV Loop Module
- Peak Analysis
- Cyclic Measurements
- Analysis Manager
- Kent Device Enabler
- LabChart Remote App
- LabChart Online
- Channel Calculations Integral

### Extend your research

ADInstruments systems give you the flexibility to extend your research into new fields. Ask one of our experts to design a system to suit your needs.

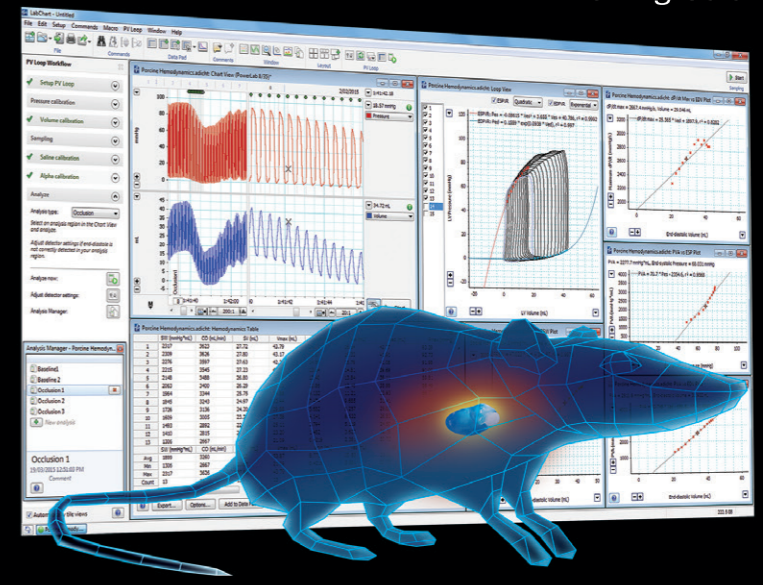
Human	Animal
Cardiovascular	Cardiovascular
Exercise and Sport	Telemetry
Respiratory	Autonomic
Autonomic	Behaviour, Sleep and Neuroscience
Sleep	Tissue and Circulation
Speech Pathology	Respiratory
Psychophysiology	<b>In Vitro</b>
Neurophysiology	Electrophysiology
Tissue and Circulation	Isolated Organ



PowerLab, LabChart and LabTutor are trademarks of ADInstruments Pty Ltd. All other trademarks are the property of their respective owners. PowerLab systems and signal conditioners meet the European EMC directive. ADInstruments signal conditioners for human use are approved to the IEC60601-1 patient safety standard and meet international standards. ISO 9001: 2008 Certified Quality Management System.

# Animal Cardiovascular Overview

Whether your research is basic or translational, or somewhere in between, ADInstruments offers a range of solutions for accurate and sensitive cardiovascular measurements.



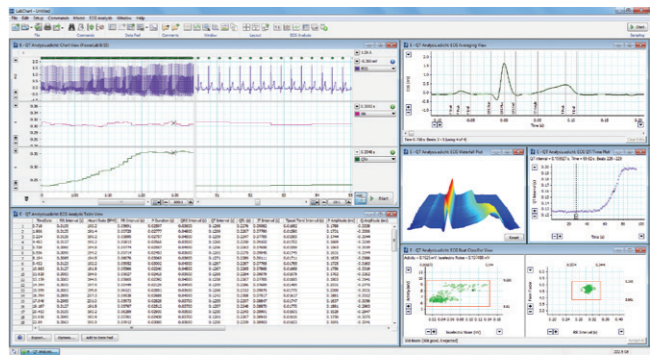
With the ability to integrate data streams from blood flow, NIBP, isolated heart, arterial pressure, ventricular pressure and volume, laser doppler flow, electrophysiology and more, our systems can evolve as your experiments do – ensuring quality results wherever your research takes you.

#### Hemodynamics

Whether used for basic biological investigation or disease focused research, high-fidelity hemodynamics data coupled with specialized analysis tools leads to powerful results in diverse and multidisciplinary applications.

#### Flexible Data Acquisition

ADInstruments systems provide an integrated solution to advance life science research. With the combination of LabChart analysis software and a PowerLab data acquisition unit you have the flexibility to collect and synchronize a wide range of signals for analysis. We also offer a range of LabChart compatible solutions able to stream directly in LabChart.



Screenshot: Rat ECG analysis in LabChart



**LabChart**

LabChart data analysis software creates a platform for all of your recording devices to work together, allowing you to acquire biological signals from multiple sources simultaneously and apply advanced calculations and plots as your experiment unfolds.

PowerLab is engineered for precise, consistent, reliable data acquisition for life science research, giving you the reproducible data you need while meeting the strictest international safety standards.



**PowerLab**



ADInstruments is the exclusive global distributor of Millar Mikro-Tip® pressure catheters and associated hardware for invasive pressure volume and ventricular pressure volume recording. By combining these highly sensitive, minimally invasive catheters with PowerLab for data acquisition and LabChart for data analysis, you can be sure of clear and accurate results. To learn more visit [adstruments.com/partners/millar](http://adstruments.com/partners/millar)

Visit our website or contact your local ADInstruments representative for more information

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# Ventricular Pressure Volume (PV)

Changes in ventricular function for normal and diseased conditions can be analyzed using ventricular pressure volume (PV) loops, which are generated by plotting real-time left and right ventricular pressure against ventricular volume during a complete cardiac cycle.



## Typical Studies:

- Systolic and diastolic dysfunction
- Pulmonary hypertension
- Cardiac hypertrophy
- Cardiac failure
- Cardiovascular remodelling and vascular occlusions
- Pharmacology / Toxicology studies
- Phenotyping
- Ischemia / Reperfusion studies
- Cardiac resynchronization therapy
- Surgical interventions



## MPVS Ultra Foundation Systems

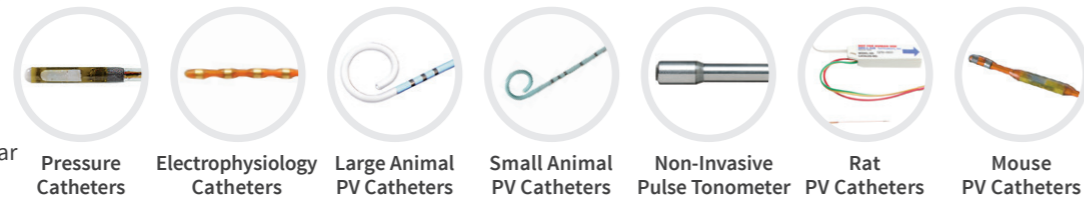
Millar Pressure Volume (MPVS) Ultra Foundation Systems are configured for accurate measurement of left ventricular pressure (LVP) and volume, and work with a range of over 50 Millar catheters, including Mikro-tip and ultra-miniature options. Customize your system with your choice of accessories and transducers from the ADInstruments range.

### Each System includes:

- PowerLab: 16/35 or 8/35
- LabChart and LabChart Pro analysis software
- PV Loop Module
- MPVS Ultra Pressure-Volume Unit or MPVS Ultra Single Segment Pressure-Volume Unit (MPVS Hardware, power and USB cables, Ultra control software, Training CD)
- MPVS Cable Packs
- Applicable calibration cuvettes

### Millar Mikro-Tip Catheters

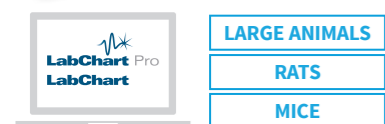
Millar's range of solid-state Mikro-Tip catheters are the gold standard for pressure and PV measurements and have revolutionized cardiovascular research using animals.



# Invasive Blood Pressure

Blood pressure is the pressure exerted by blood on the surrounding vessel walls as it is pumped around the cardiovascular system by the heart. The ability to measure continuous arterial and vascular pressure signals directly at the source through invasive blood pressure recordings provides a greater level of data accuracy and sensitivity to support your cardiovascular research.

Ideal for beat-to-beat monitoring of basic, acute and chronic cardiovascular measurements, invasive pressure recordings also allow for assessment of time variance and dynamics of change in data over time. Whether you wish to record and analyze blood pressure in small or large animals, ADInstruments can help you create a solution tailored for your research requirements.



## Typical Studies:

- Pulmonary hypertension
- Acute or chronic cardiovascular monitoring
- Tumor research
- Hypertrophy, infarction, cardiomyopathy and other disease models
- Systemic circulation or ventricular studies
- Intracranial studies

## Mikro-Tip BP Foundation System

The Mikro-Tip BP Foundation System allows measurement of blood pressure in small to large animals. Choose from a wide range of Mikro-Tip pressure catheters that allow you to place the sensor in an artery or heart to measure blood pressure directly.

- Each System includes:** PowerLab 8/35 • LabChart Pro software • Bridge Amp • Interface cables

# Invasive Blood Flow

Invasive blood flow meters, designed for mice up to large animals, allow you to perform accurate and precise fluid flow measurements in or around blood vessels - even with atypical animal models, such as fish. With different sensors, these devices can also be used for measuring volume flow in other non-aerated liquids including saline and buffer solutions.

By pairing state-of-the-art ultrasound transit-time technology for Transonic with LabChart and PowerLab, you can reliably record absolute volume flow rates, relative flow rate changes and chronic volume flow with high resolution and low offset.



**Blood FlowMeter:** Single channel laser Doppler flow meter to measure blood cell perfusion in the microvasculature of tissues and organs.

## Typical Studies:

- Systolic and diastolic dysfunction
- Pulmonary hypertension
- Cardiac hypertrophy
- Cardiac failure
- Cardiovascular remodelling and vascular occlusions
- Pharmacology / toxicology studies
- Transgenic manipulation
- Ischemia / Reperfusion studies
- Tissue perfusion studies
- Cardiac resynchronization therapy
- Surgical interventions

### Main System Components



**Transonic Perivascular and Tubing Flowmeters:** Two or three channel consoles. Use with suitable flowprobes or flowsensors (sold separately) to measure blood flow.



**Cardiac Output Flowprobes 8-36mm:** PAU or COnfidence flowprobes for acute and chronic measurements of cardiac output in large animals.



**Microcirculation Flowprobes 0.5 and 0.7mm:** For acute flow measurements in small vessels. Ideal for mice.



**Precision Handle Flowprobes:** Clinical-style handle for intraoperative measurements in preclinical animal trials or vascular surgeries.



**Perivascular Flowprobes 0.5-20mm:** Standard or custom configurations for small to large animals.



**Perivascular Flowprobes 1 and 1.5mm:** For small acute or chronic applications that require a large probe head for robustness.



**Clamp-on Flowsensors 3 - 32mm OD:** These flowsensors "clamp on" to most flexible laboratory and extracorporeal tubing.



**Inline Flowsensors 2-2.5mm ID:** Designed for flexibility: sensors splice into lab tubing and accurately measure fluid flow.



**Fine Needle Blood Flowprobe 0.5mm:** Developed for minimal tissue trauma during invasive insertion.



**Bent-tip Needle Blood Flowprobe 1mm:** For measurement in specialist applications such as gingiva and nasal mucosa.

# Non Invasive Blood Pressure

Non-invasive blood pressure recording allows you to capture intermittent blood pressure data in awake rats or mice over long sampling periods easily and unobtrusively with a high standard of care. Reliably record and monitor blood pressure using LabChart and PowerLab paired with an NIBP system, specialized tail transducers/cuff, and rodent restrainer. With this setup you can intermittently measure blood pressure based on the periodic occlusion of tail blood flow. Simultaneously acquire additional physiological signals with PowerLab and LabChart to support your research.



## Non Invasive Pulse Tonometer

Designed for non-invasive recording of pulse pressure wave contours, this hand-held wand probe is equipped with a Millar Mikro-Tip pressure sensor at the tip. The high frequency response ensures accurate reproduction of pulsatile waveforms.

## NIBP Systems for Mice and Rats

### Typical Studies:

- Drug Discovery
- Animal Health Monitoring
- Phenotyping
- Long Term Studies

Pair with PowerLab and LabChart to obtain NIBP measurements from mice with tail diameters of 3-6mm and rats with tail diameters of 5-10mm. Includes NIBP controlled and Pulse transducer/pressure cuff.

