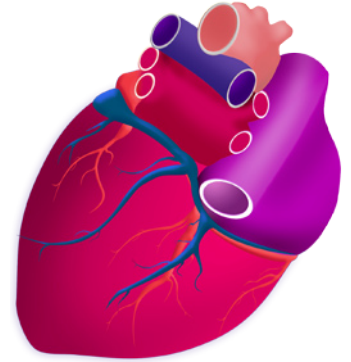


## Perfused Heart Assessment: Langendorff and Working Heart Training One Day Training Course for the Cardiovascular Scientist



ADInstruments is pleased to offer professional on-site surgical training for the In Vitro Langendorff/Working Heart System. Leverage the knowledge and experience of ADInstruments' Surgical Research Consultant to maximize your equipment investment and curtail typical experimental roadblocks. You and your staff will reap the benefits of receiving hands-on surgical training from an established scientist with over 10 years of research expertise performing isolated heart perfusion studies in both academia and industry.

ADInstruments has designed a one-day training course which pairs the essential theory, surgical techniques, and equipment necessary to implement successful Langendorff and Working Heart research studies from day one. This course can be held in your lab using your equipment at your convenience.

### Services Provided:

- **Glassware Priming and Plumbing Overview**
- **Langendorff Principles and Surgical Demonstration**
- **Working Heart Principles and Surgical Demonstration**
- **Transducer Configuration and Measurement Parameters**
- **Certificate of Completion: Isolated Perfused Heart Training**

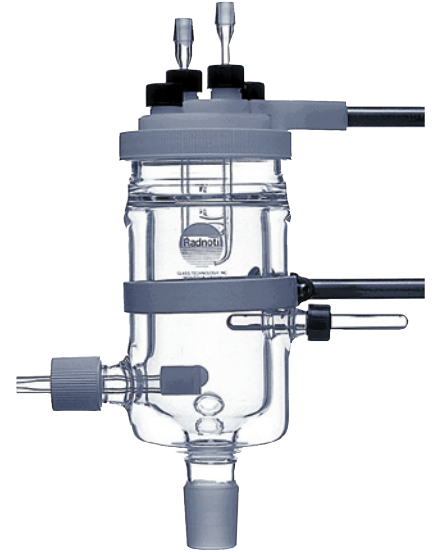
### ***CAN'T AFFORD TO WASTE ANY TIME GETTING STARTED?***

Avoid common pitfalls and take the right steps to streamline your physiological data acquisition and analysis. Investing in a detailed and structured training program encouraging hands-on learning will shorten the learning curve and fast track your studies.

## Training Overview:

### Glassware Priming and Plumbing Overview

- Thermo bath operation
- Peristaltic pump operation
- Glassware priming
- Retrograde perfusion circuit (Langendorff): constant pressure, constant flow, recirculating and non-recirculating
- Working heart perfusion circuit
- Glassware maintenance and post experimental cleanup
- Troubleshooting techniques



### Langendorff Principles and Surgical Demonstration\*

- Basic cardiac principles
- Live surgical demonstration and hands on assistance
- Removal of the heart
- Heart anatomy (landmarking)
- Aortic cannulation
- Retrograde perfusion circuit (Langendorff method)
- Perfusion flow rates
- Constant flow vs. constant pressure

### Working Heart Principles and Surgical Demonstration\*

- Basic cardiac principles
- Heart anatomy (landmarking)
- Live surgical demonstration and hands on assistance
- Left atria cannulation
- Working heart perfusion circuit
- Perfusion flow rates
- Pre-load pressure

# Isolated Heart Techniques Training Series

- After-load pressure
- Starling curve demo

## Transducer Configuration and Measurement Parameters

- Transducer placement
- Left Atria Pressure (Pre-load)
- Aortic Pressure (After-load)
- Systolic and Diastolic Pressure from the aortic line
- Ventricular Pressure
- Left Ventricular dP/dt
- Cardiac Electrical Activity
- Heart Rate
- Perfusate Temperature
- Cardiac pacing

***\*Disclaimer:** ADInstruments' surgical consulting staff will only perform surgeries on 300 gram rats or larger and will not administer anesthesia. Anesthetic and scientific experimental protocols will neither be provided nor recommended by ADInstruments. Proof of an approved animal use protocol must be submitted to ADInstruments by either fax at (719) 576-3971 or email prior to scheduling a training date. ADInstruments will not perform surgeries without proof of an approved animal use protocol. All departmental and administrative regulations requiring approval for animal handling by ADInstruments' staff at your facility must be submitted to ADInstruments 30 days prior to training. Please contact your ADInstruments representative for a list of consumables and surgical equipment required for training.*