



C.L. Davis
Laboratory Animal Workshop

Equipment I

Raleigh, NC
May 12, 2006

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Acknowledgements!

- **Diane Forsythe and Mary Grant - NIEHS**
 - **Primary 2 X 2 slide sets**
- **US Army Slide Set**
- **Sue Spray and Tim Barker - Scripps Institute**
 - **Electronic version of slides**
- **Previous presenters – updates**
 - **Rick Fish - 2005**
 - **Tom Golding - 2004**



Disclaimers

- **This is not an ACLAM sanctioned presentation**
- **All information is deemed reliable and correct**
 - No warranty for accuracy
- **No information presented is known to be specifically included in ACLAM Board Certification Exam**



Strategy of Review

- **Equipment material is long lived**
- **May see obsolete/old models**
- **know function**
- **have 30 seconds to ID and associate questions on function and use**
- **review recent literature and recognize associated equipment**
- **LABSG website – UIC/CL Davis Slide Sets**
 - <http://24.21.238.18/~dhickman/index.html>



Types of Equipment

- **Clinical/Surgical/Etc.**
- **Animal facility**
- **Animal husbandry and handling**
- **Study-related**
- **Transgenic production**
- **Diagnostic**
- **Model-related**



Equipment Vendor Catalogs

- **Harvard Apparatus**
- **Braintree Scientific**
- **Columbus Instruments**
- **Plas Labs, Inc.**
- **Myneurolab.com**
- **Lab Products, Inc.**
- **Allentown Caging Equipment**

Visit websites



Journals

- **JAALAS (Contemporary Topics)**

- Technology updates
- Advertisements

- **Lab Animal**

- **Animal Lab News**

- **Comparative Medicine**

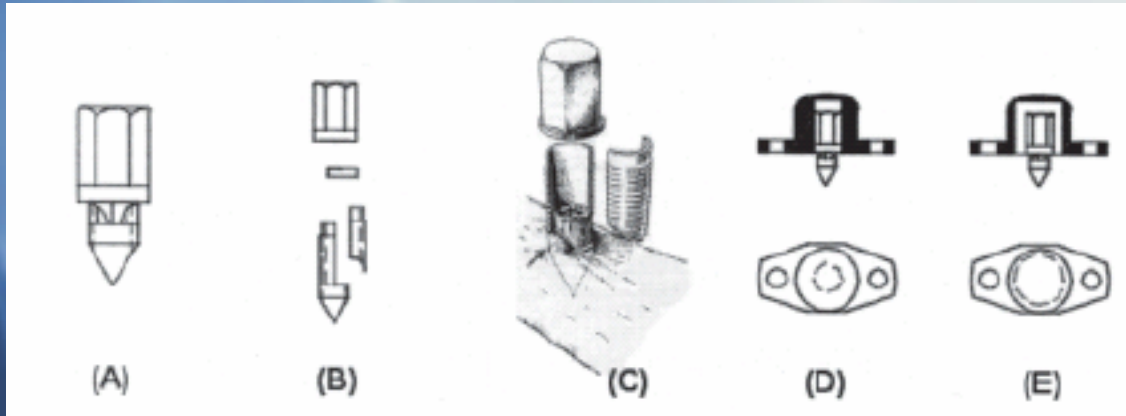
- **Laboratory Animals**

- **ILAR Journal**

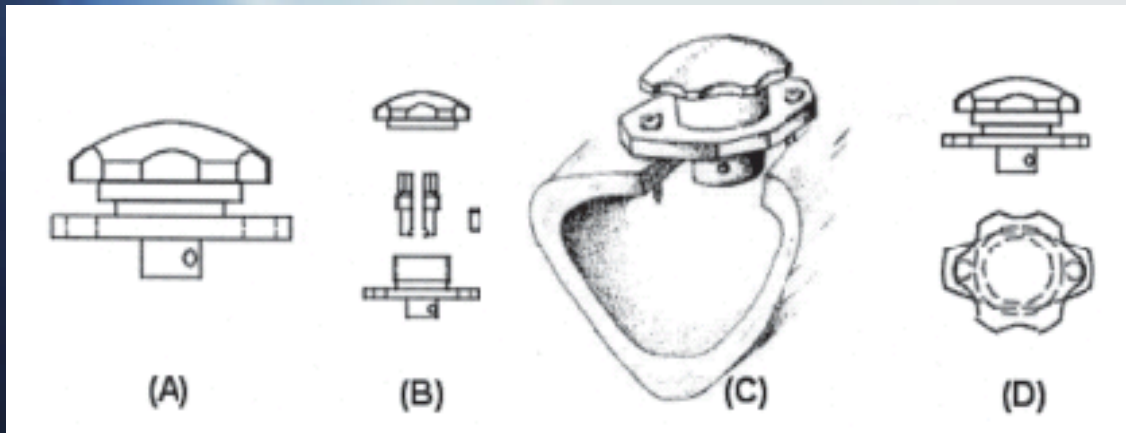
} Materials & Methods



Bone Chambers



Bone
Conduction
Chamber

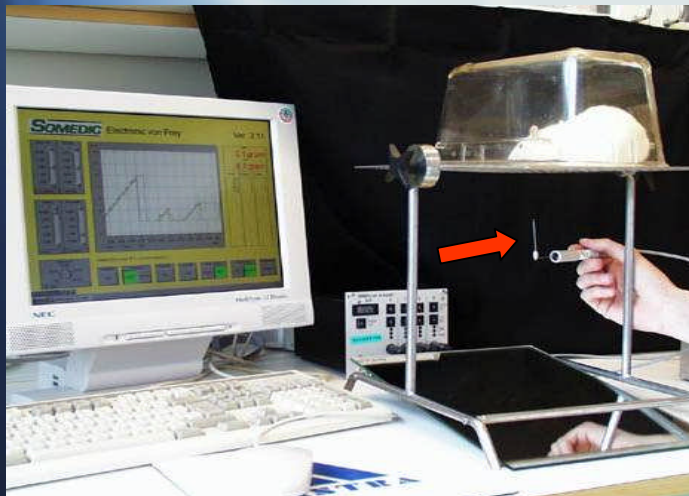
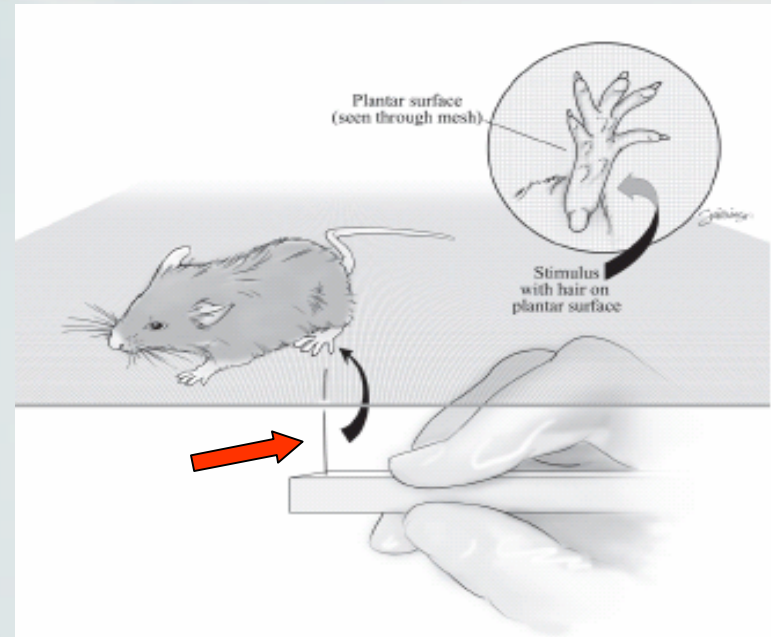


Repeated
Sampling Bone
Chamber

Comp. Med. 52(4), August 2002



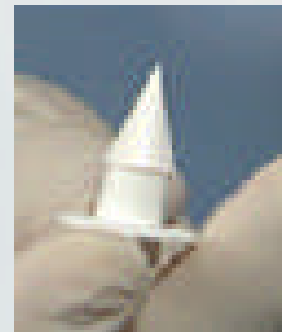
Von Frey Anesthesiometer



- **Von Frey Hairs** →
- **Measures Sensory Thresholds**
- **CT 43(3) May 2004**



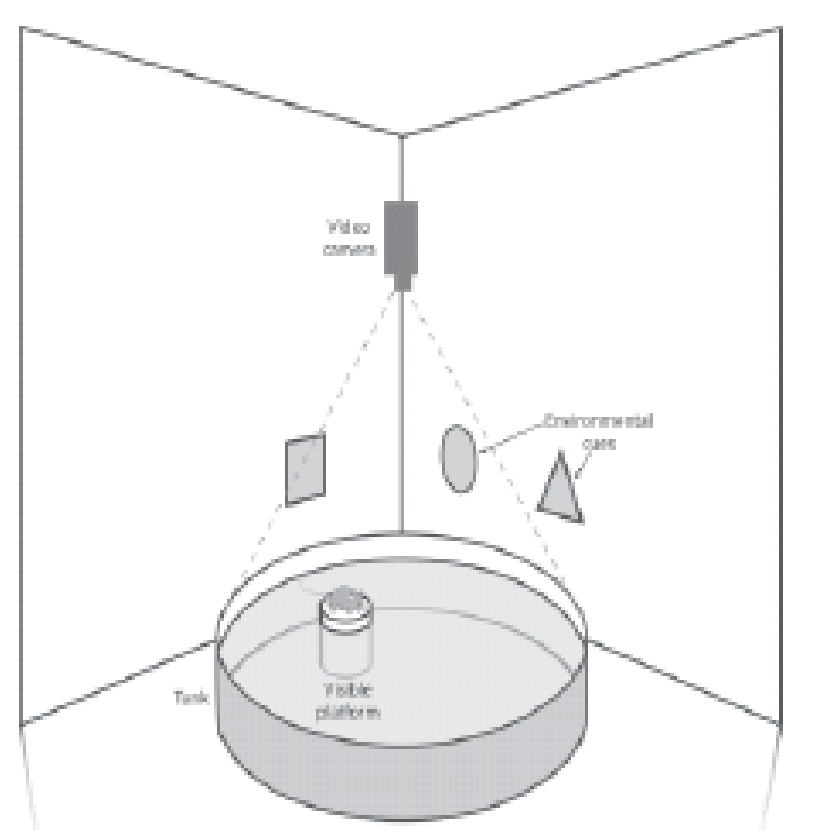
Hydropac System



- Lab Products, Inc.
- Alternative watering system



Morris Water Maze



- **Morris Water Task/Test**
- **Tests learning and memory**
- **CT 42(2) March 2003**



Vaporized H₂O₂ (VHP) Generator

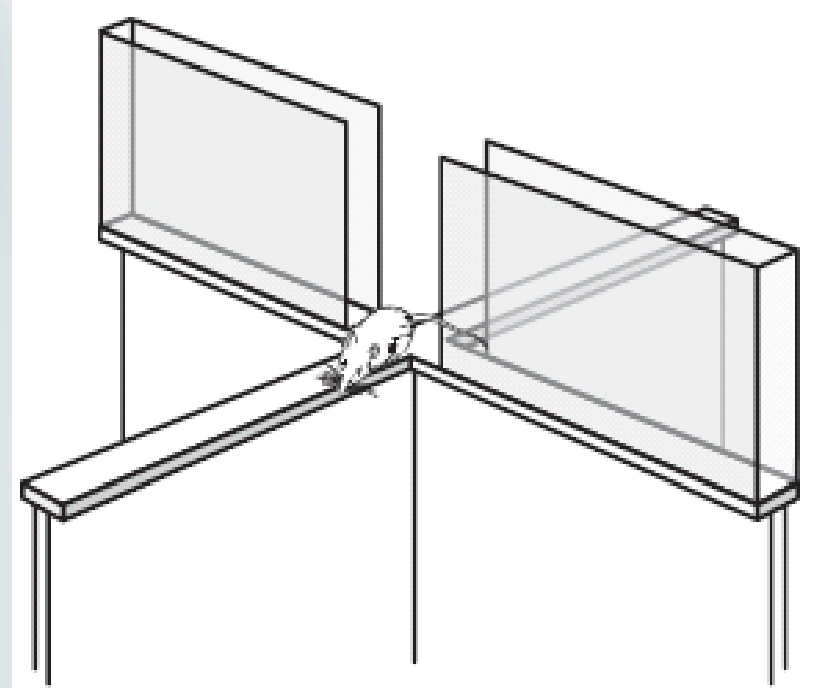


Decontamination

- Rooms
- Equipment - ventilated racks
- BSC or Changing Stations



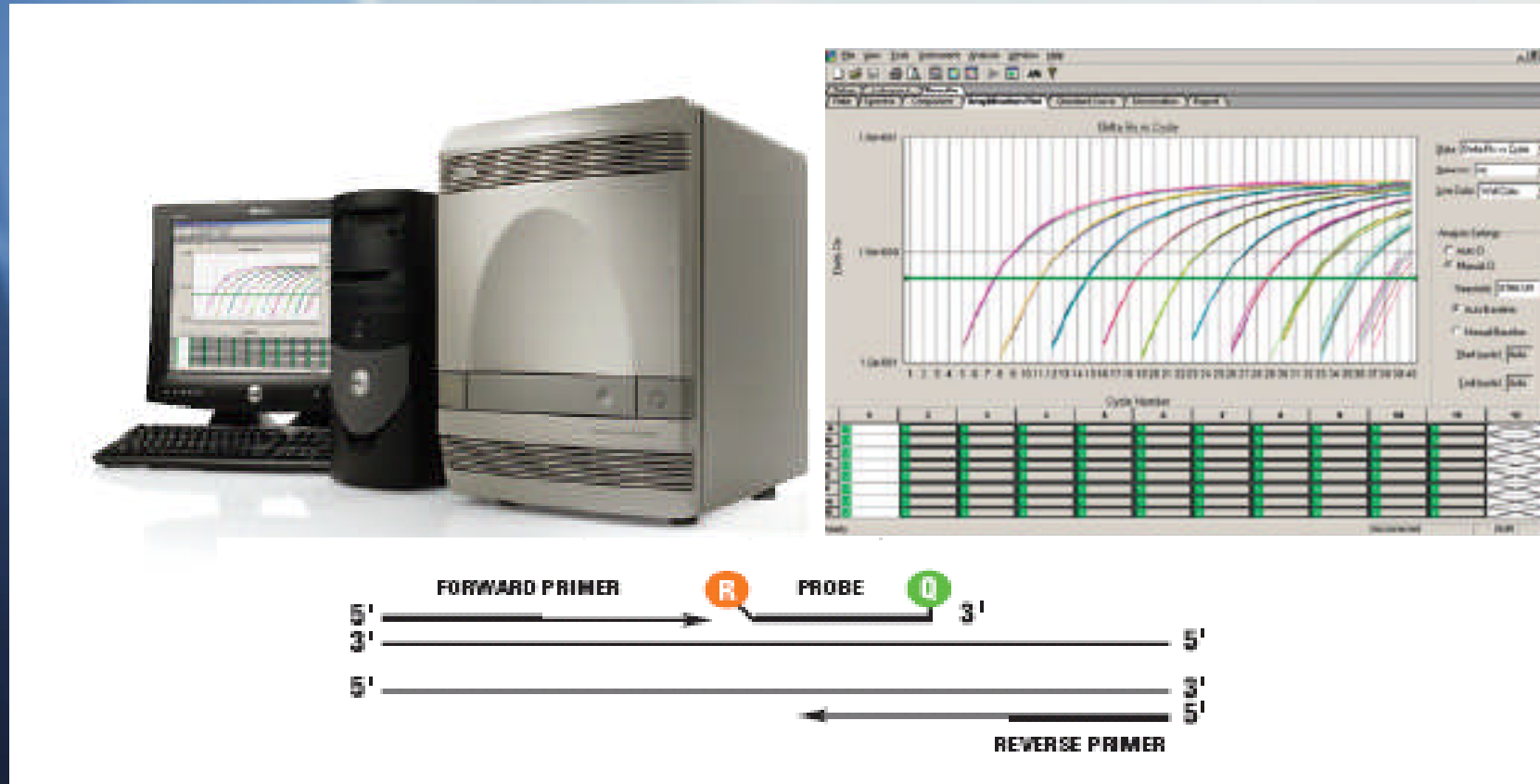
Elevated Plus Maze



- **Study of fear and anxiety**
- **Coulbourn Instruments**
- **CT 43(2), March 2004**



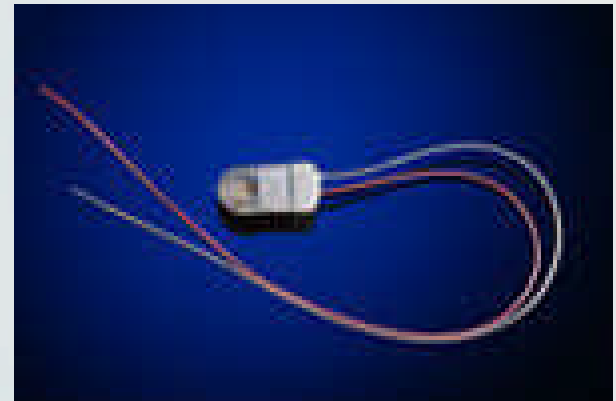
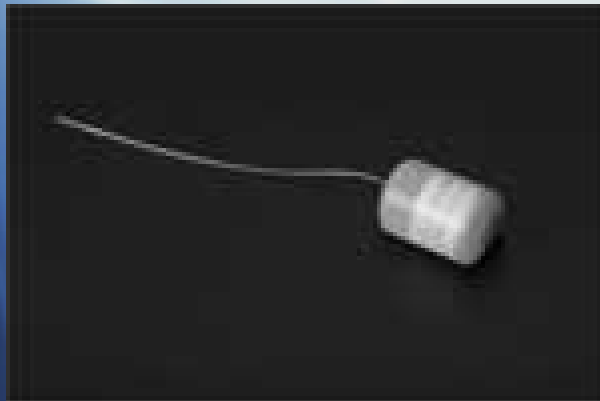
Real-Time PCR



- **Rapid PCR – no gels**
- **Not same as RT-PCR = Reverse Transcriptase Polymerase Chain Reaction**



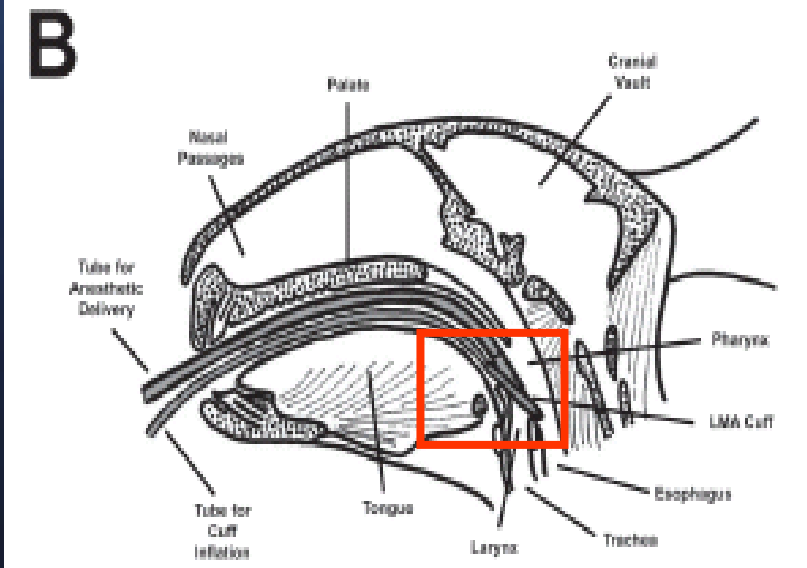
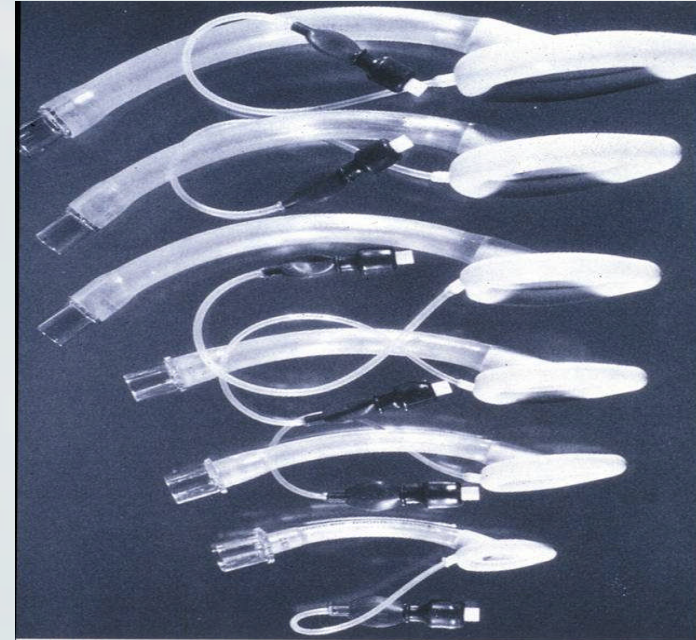
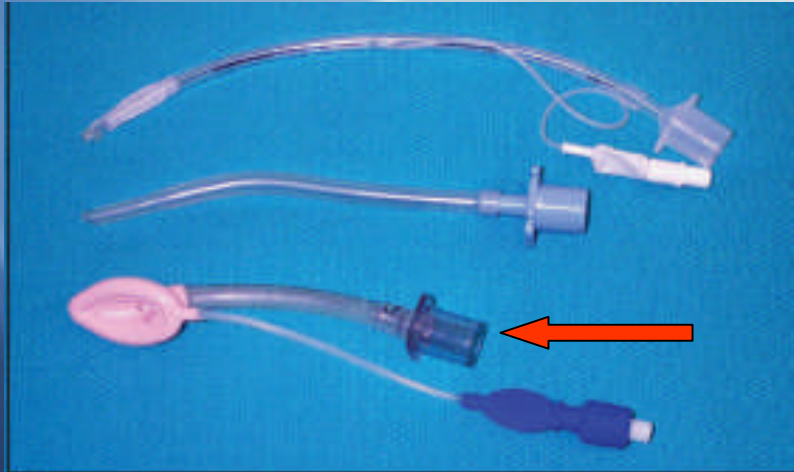
Telemetry implants



Data Sciences International (DSI) – www.datasci.com



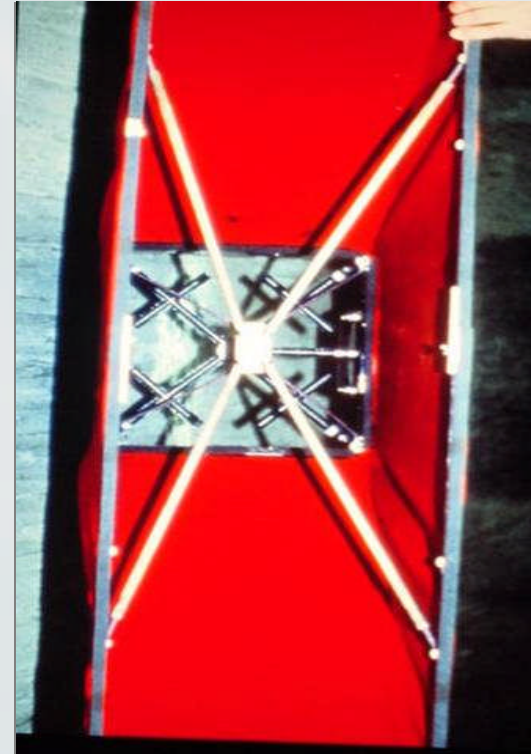
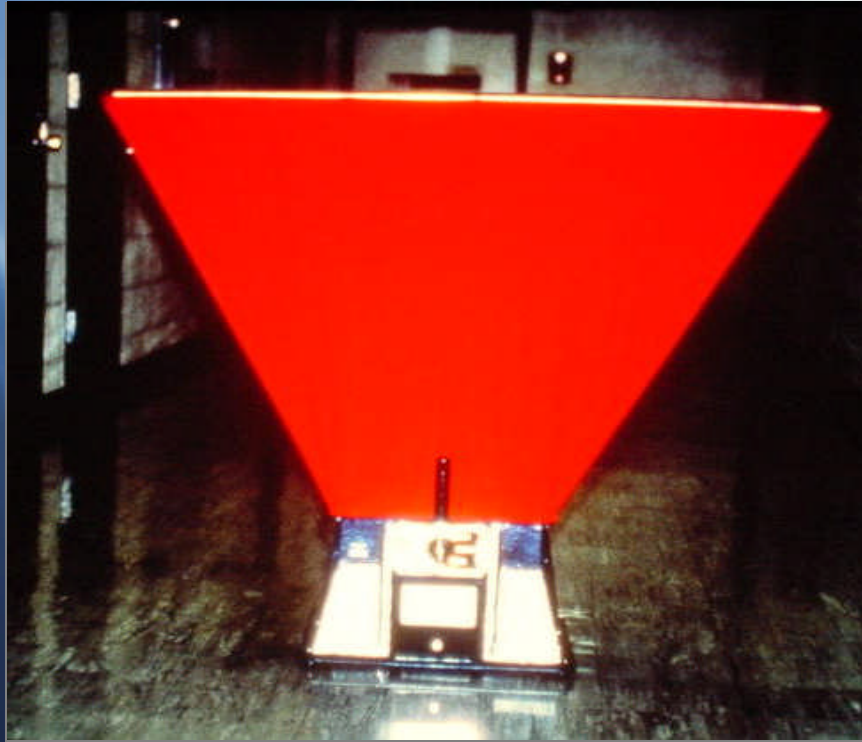
Laryngeal Airway Mask



- Alternative to endotracheal intubation in the rabbit
- CT 43(4), July 2004



Balometer



Air flow \rightarrow air changes per hour



Fleece Foraging/Grooming Board



- NHP Enrichment
- Bio-Serve, Inc. (www.bio-serv.com)



Tail Suspension apparatus



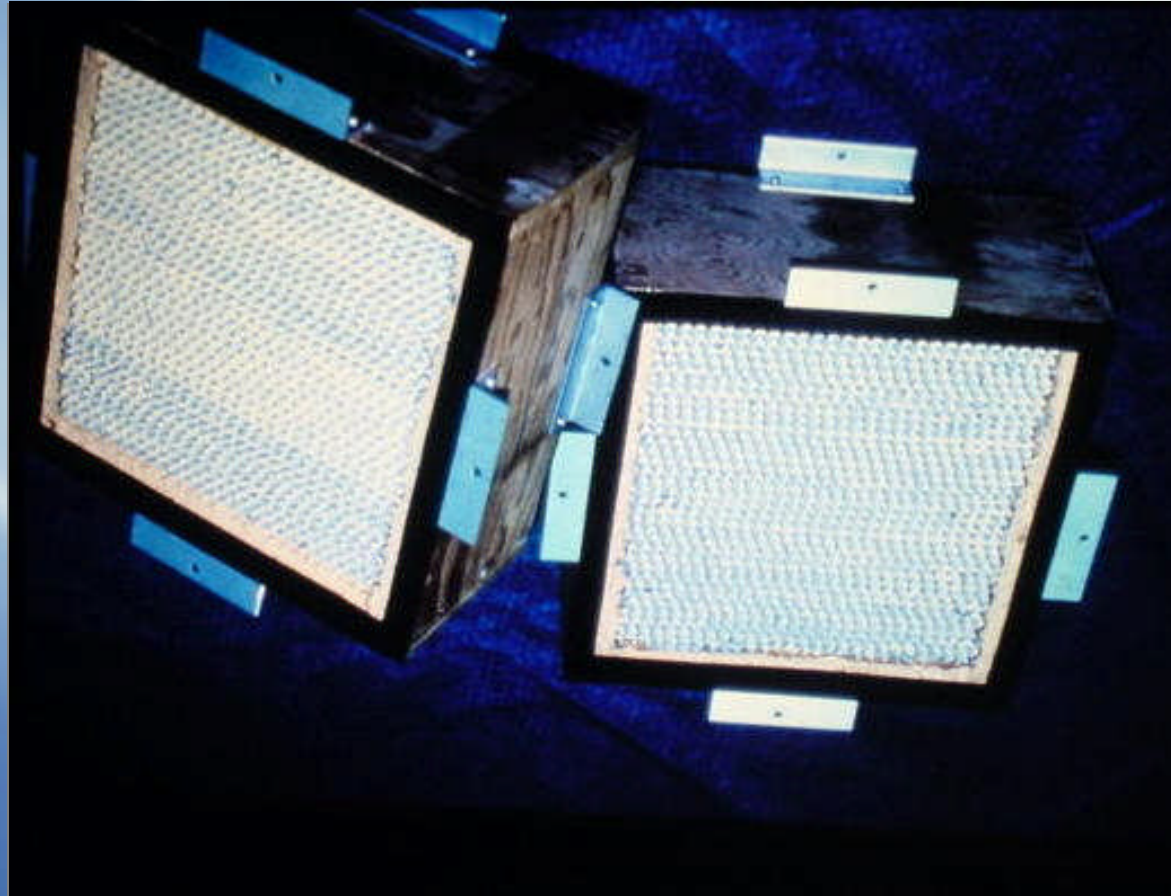
- Rodent suspended by tail until immobile
- Behavioral despair
- Model of depression
- CT 43(6), Nov. 2004



Marmoset transport box



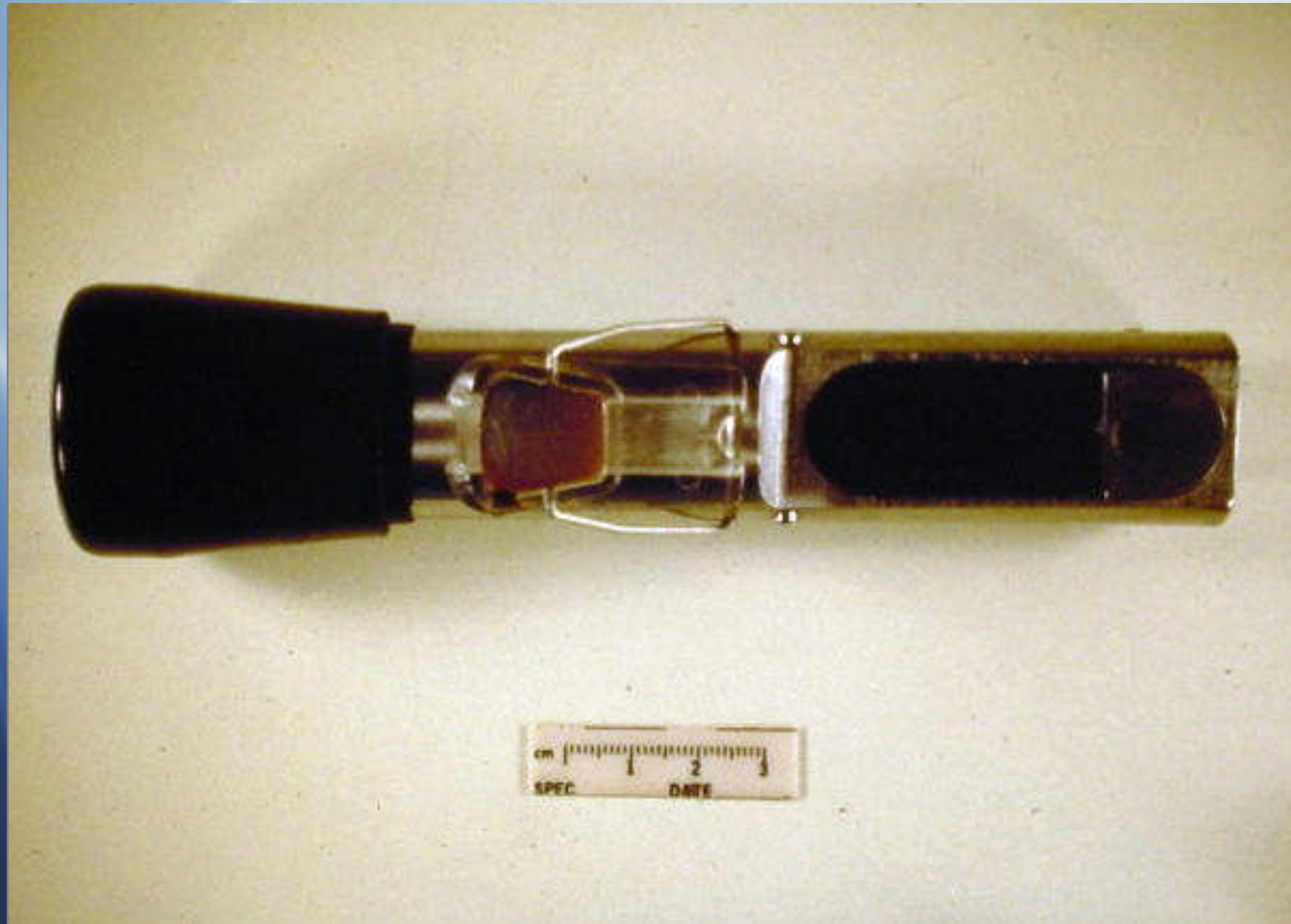
HEPA Filters



- HEPA = High Efficiency Particulate Air
- Removes 99.97% material $> 0.3 \mu\text{M}$



Refractometer



Rat Tail Indirect Blood Pressure Cuffs



Measures cuff pressure (systolic) & pulse



Biohazard Label



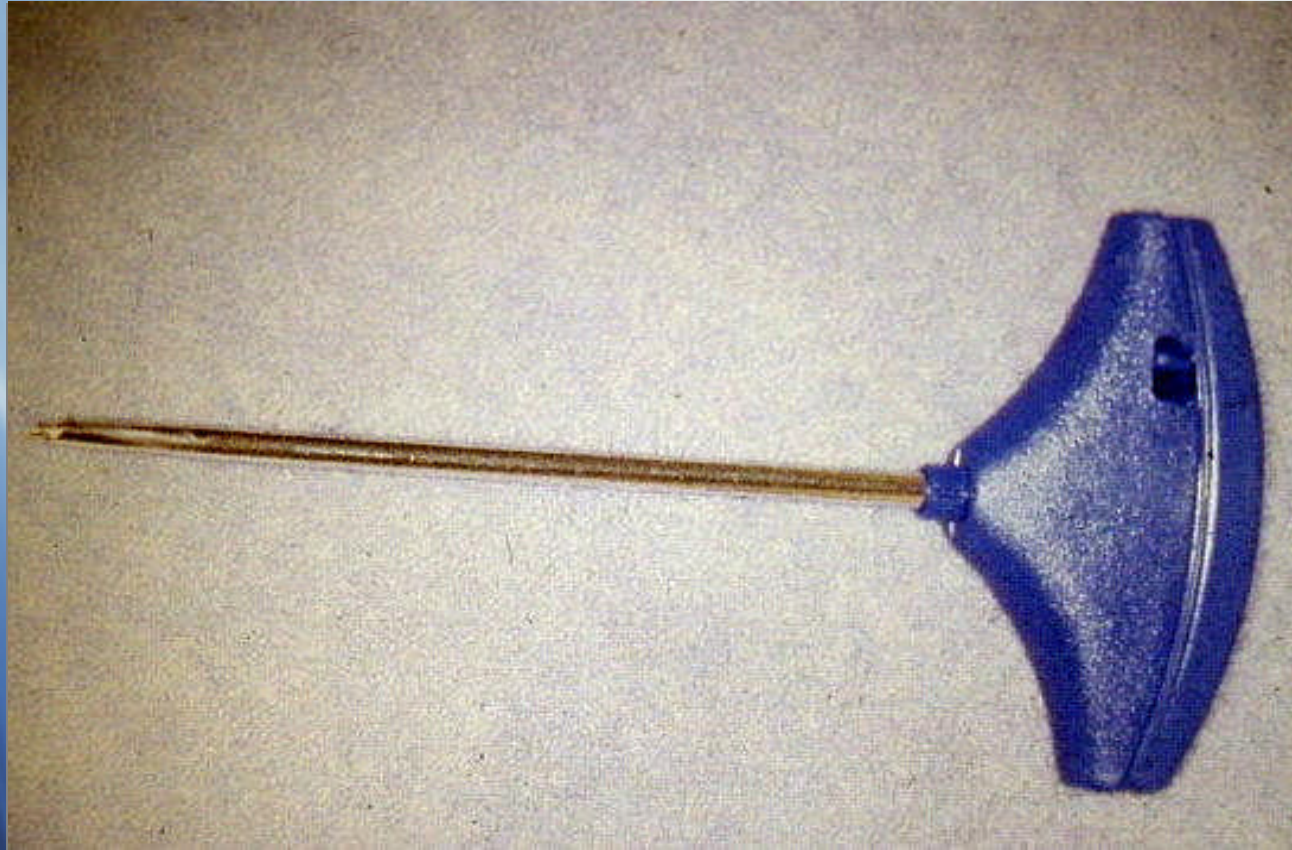
California Sea Hares



- *Aplysia californica*
- CT 44(3), May 2005
- CT 42(5), Sept 2003
- CT 41(6), Nov 2002



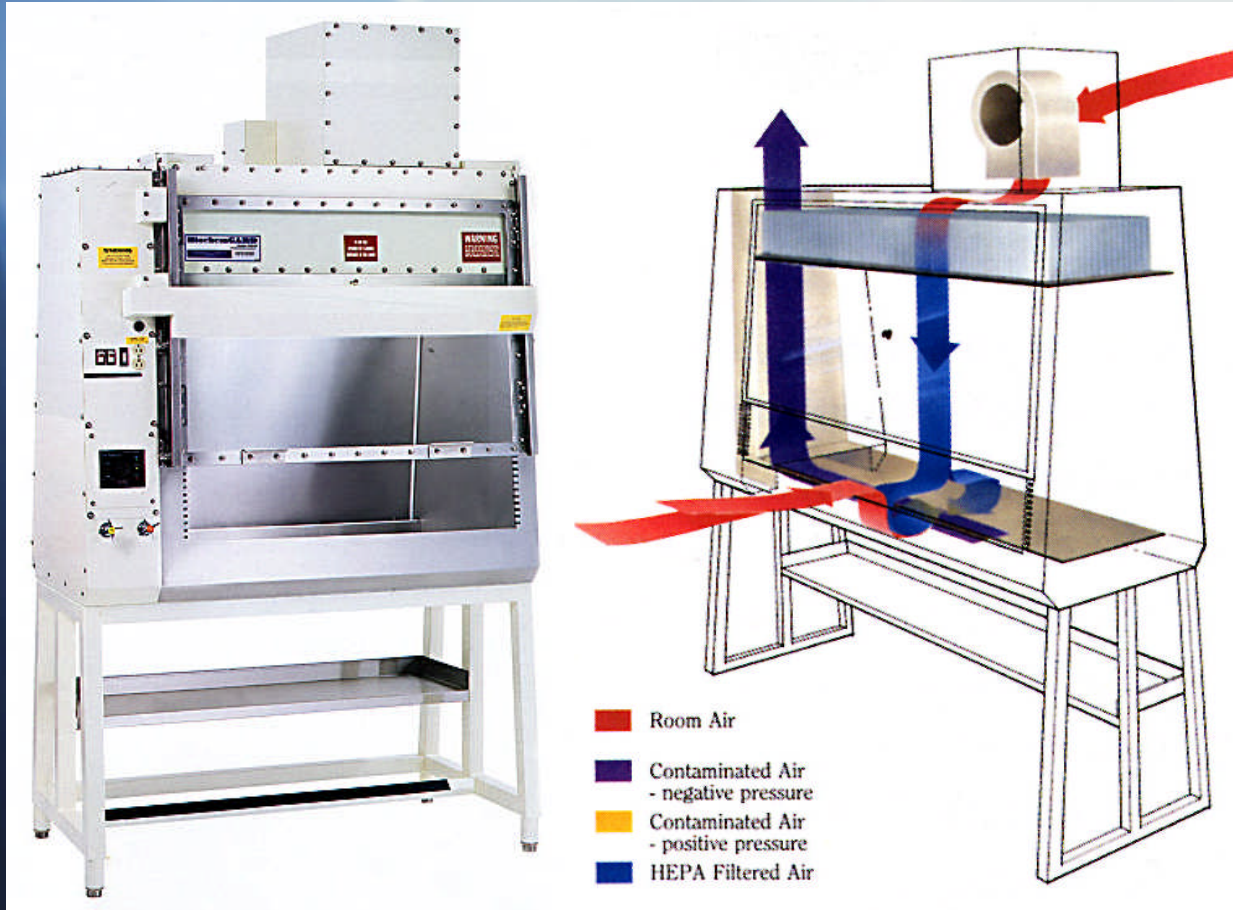
Jamshidi needle



Anesthetic Gas Scavenger Cartridges



Class II, Type B2 Biological Safety Cabinet



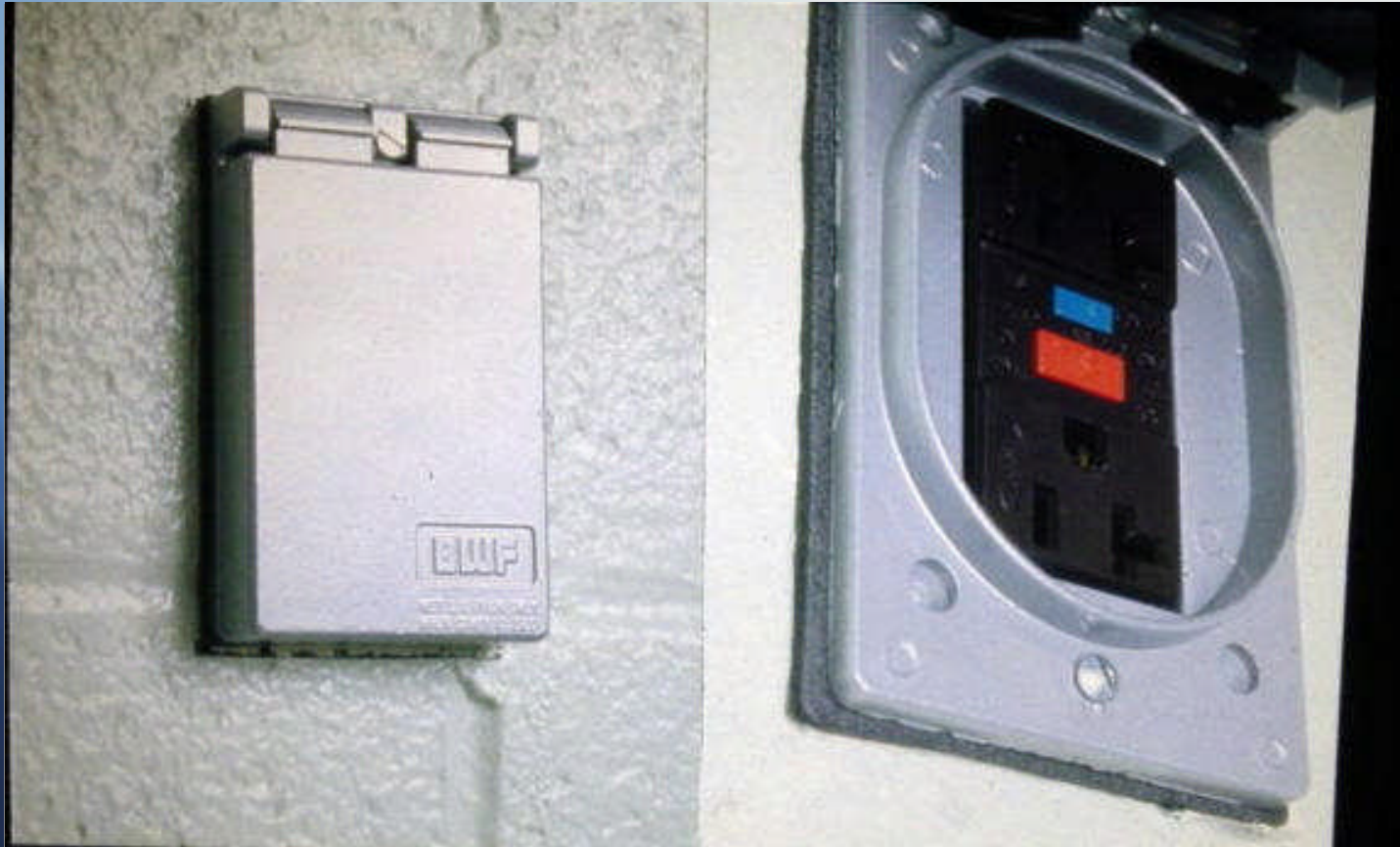
- 100% Exhaust to external duct

=

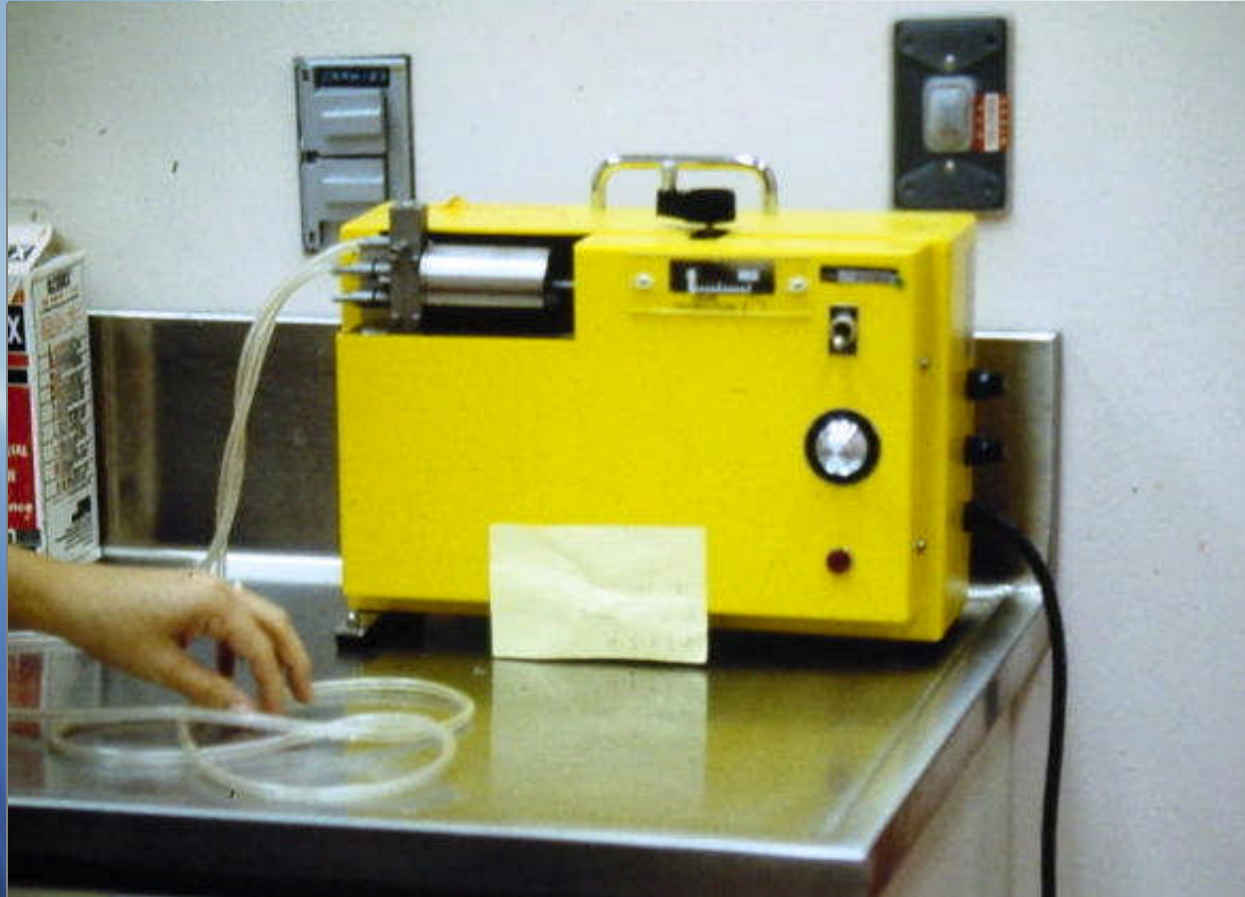
Type B2



***Ground fault interrupter (GFI) outlet
with water proof cover***



Rodent respirator



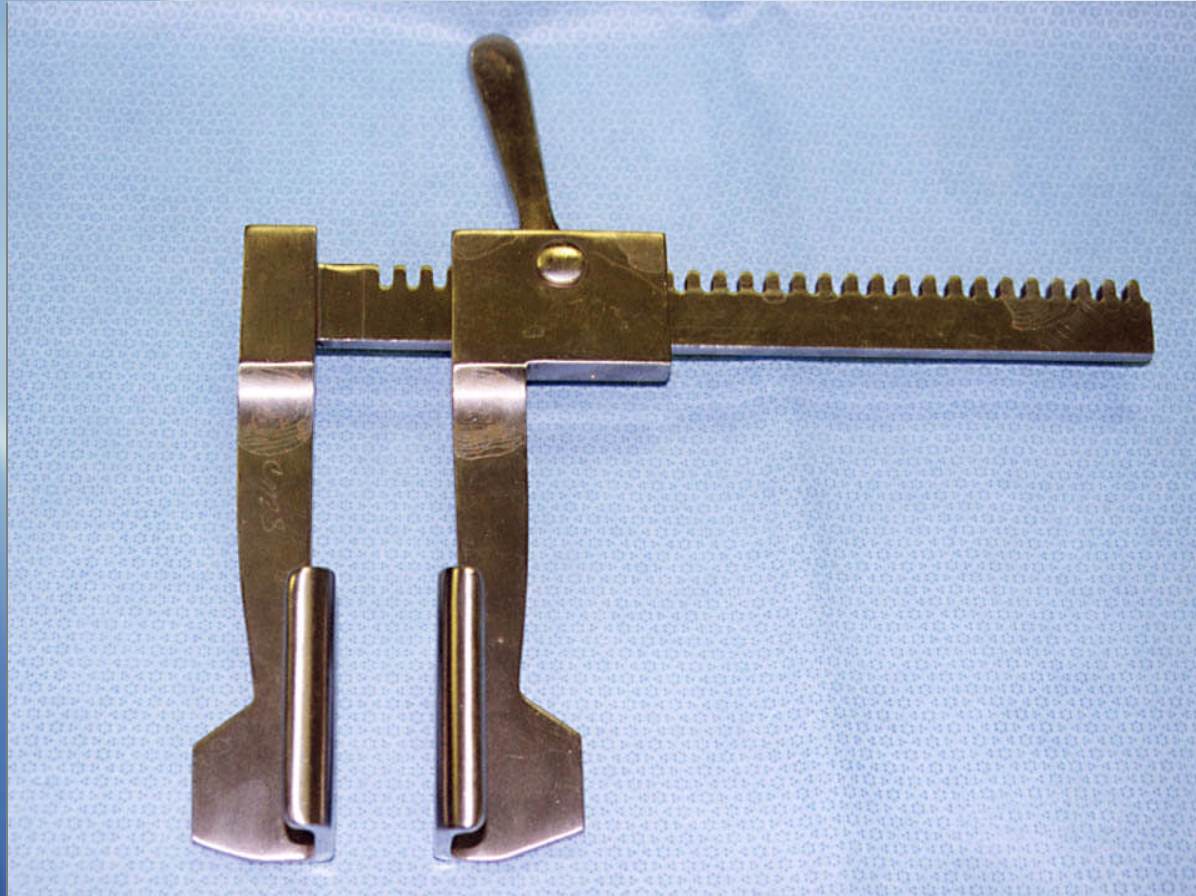
Direct Reading Anemometer



Measures air velocity



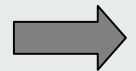
Finochietto Rib Spreader



Vertical Gel Electrophoresis Unit



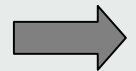
Inhalation chambers-rodents



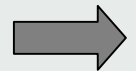
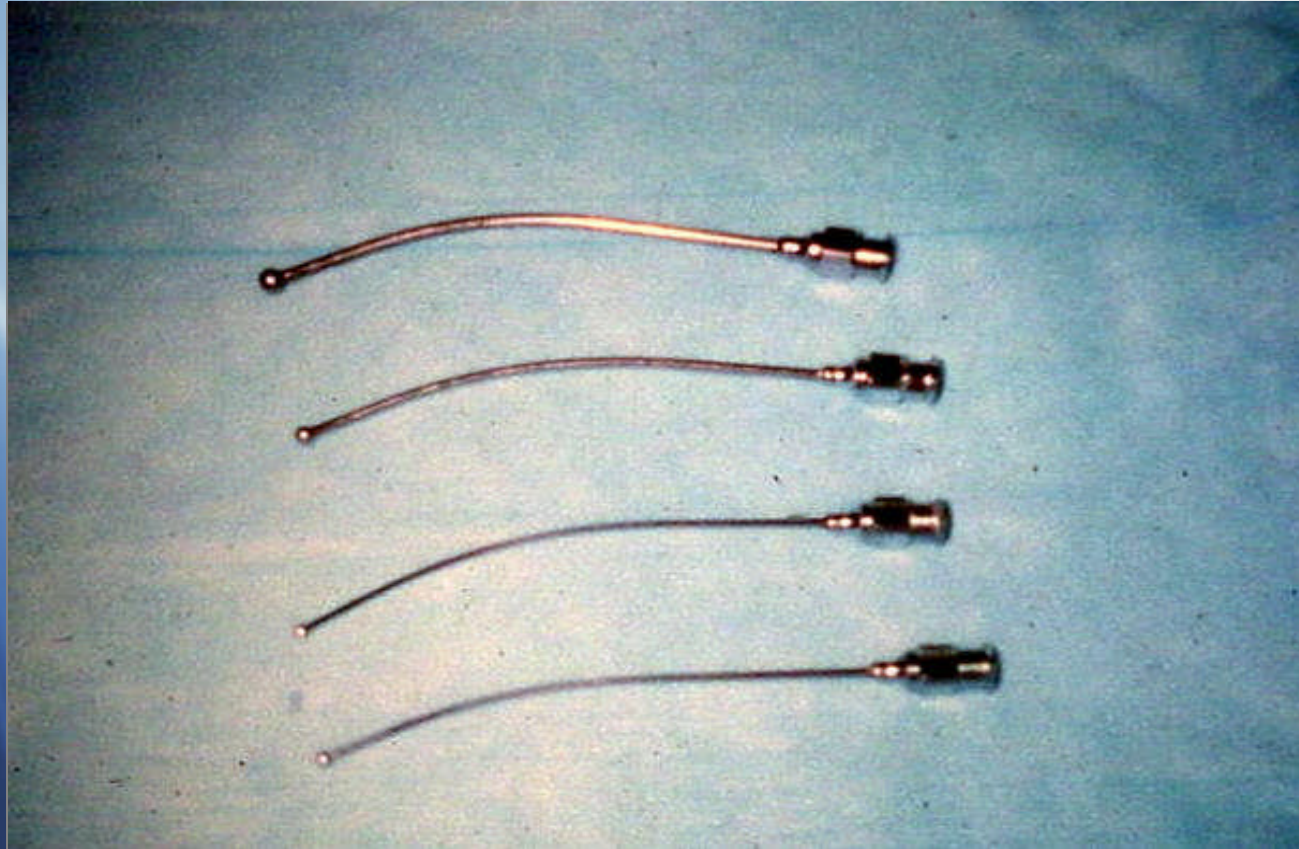
Galton Whistle



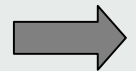
- Preyer reflex
- Guinea Pig



Gavage needles



Aquatic housing system Recirculating



Recirculating aquatic housing system



Biofilter



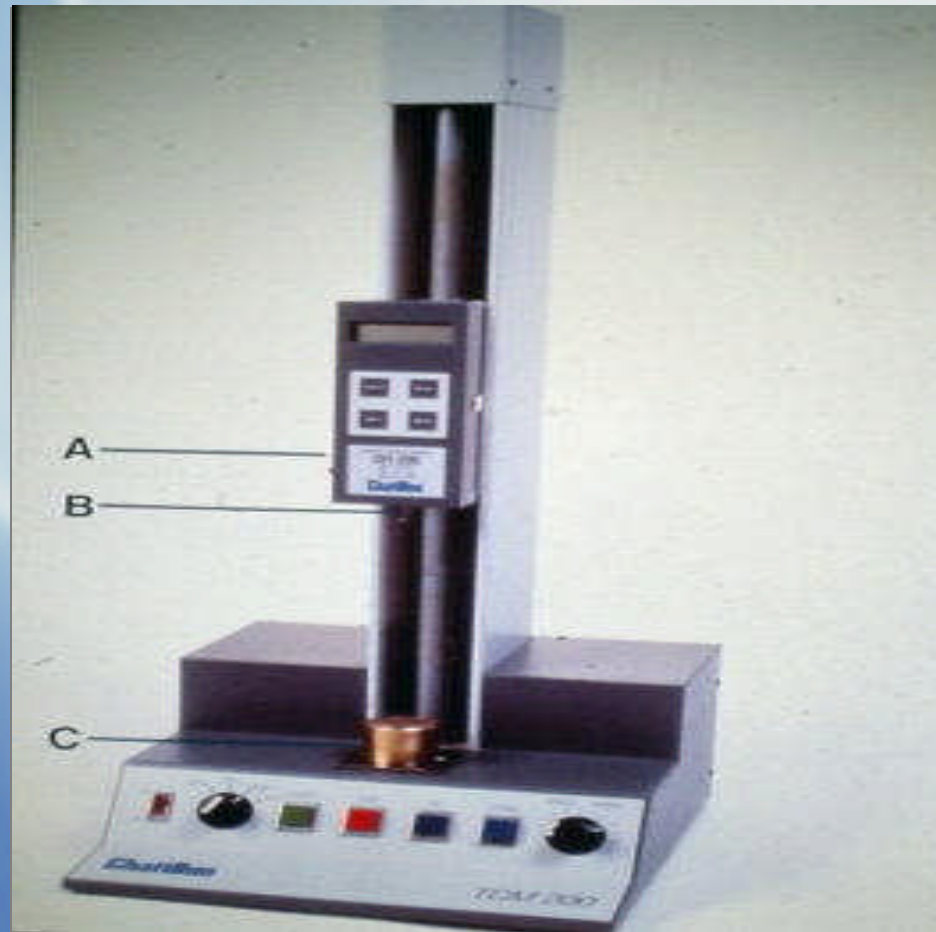
Nitrogen cycle

Ammonia (NH_3) \longrightarrow Nitrite (NO_2)
Nitrosomonas spp.

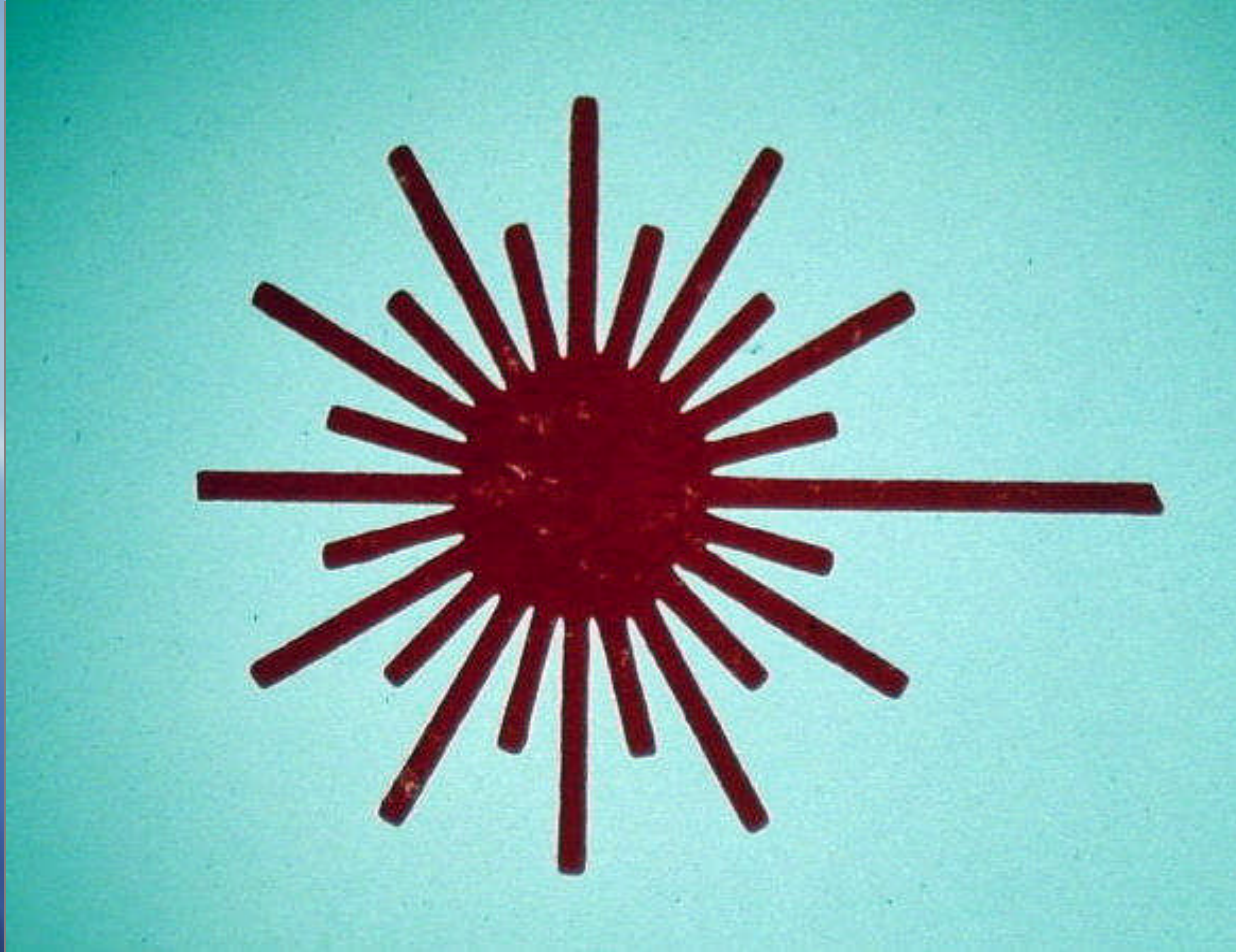
Nitrite (NH_3) \longrightarrow Nitrate (NO_3)
Nitrobacter spp.



Pellet hardness tester



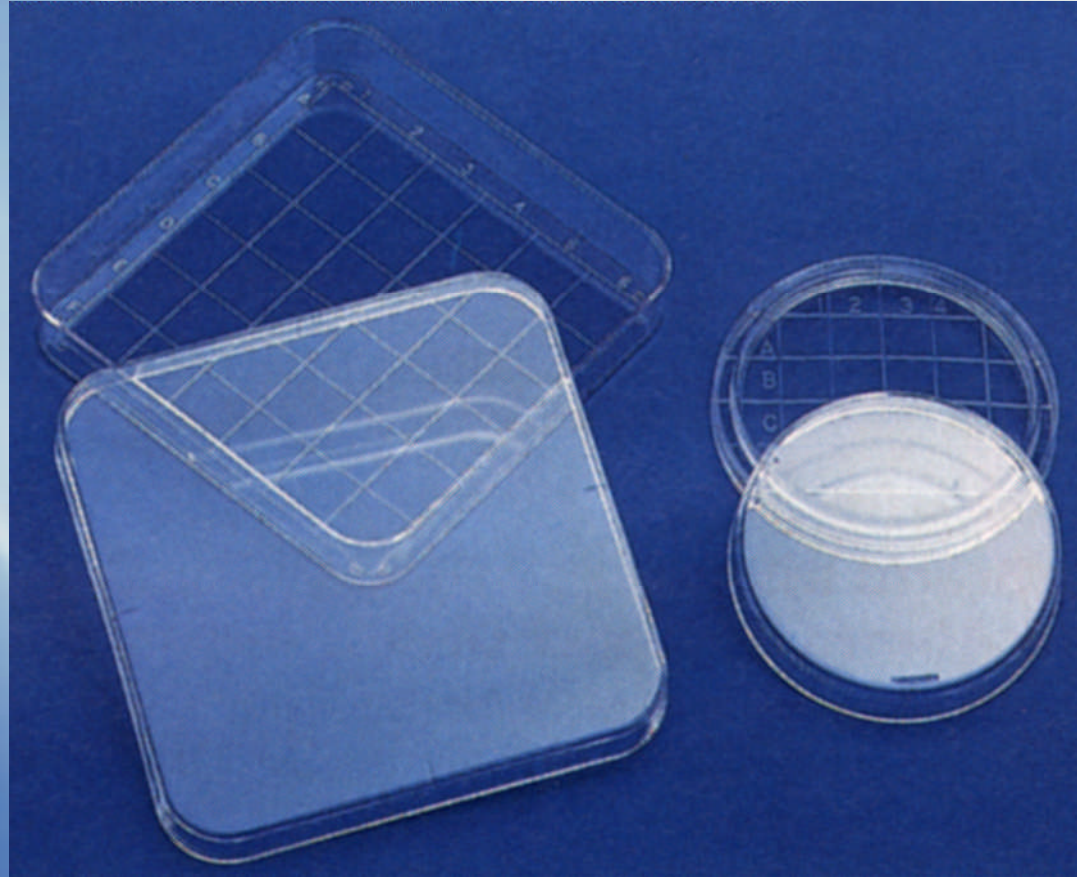
Laser



Light Amplification by Stimulated Emission of Radiation



RODAC Plate



**Replicate Organism Direct Agar Contact
(for detection & counting)**



Reverse Osmosis Water Purification



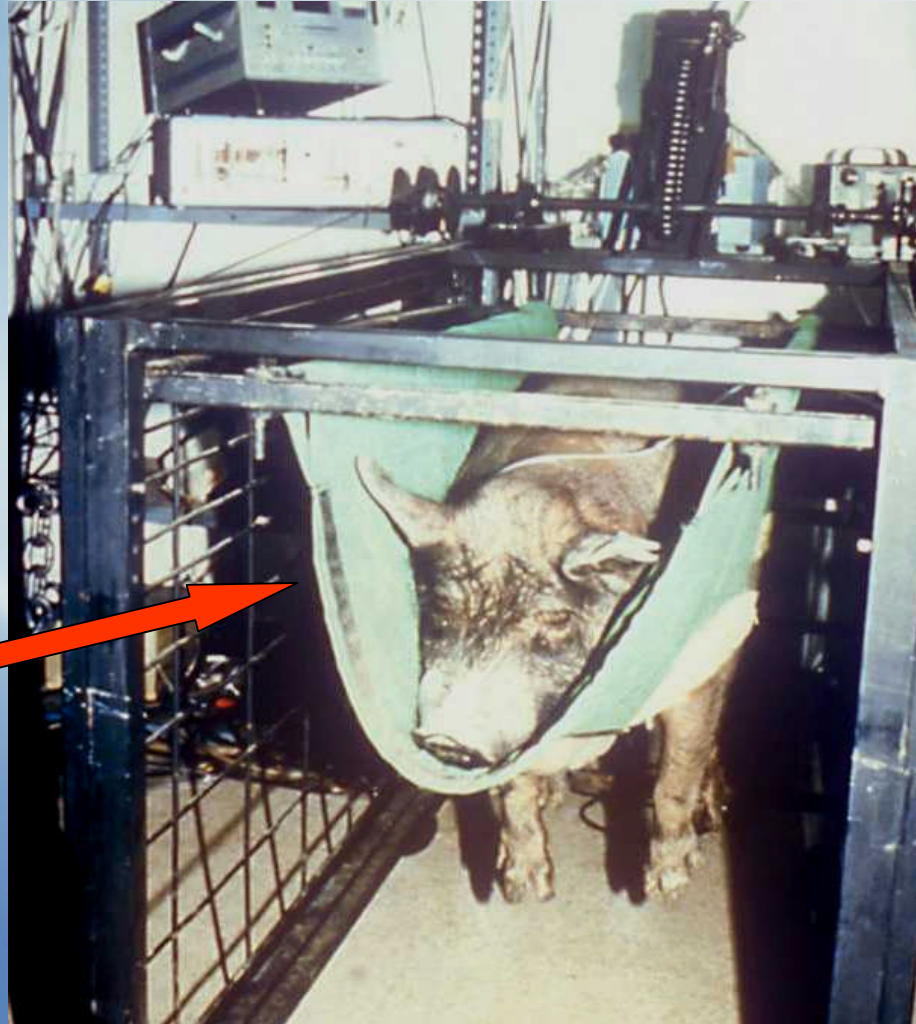
Thermal Cycler



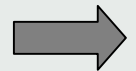
PCR = Polymerase Chain Reaction



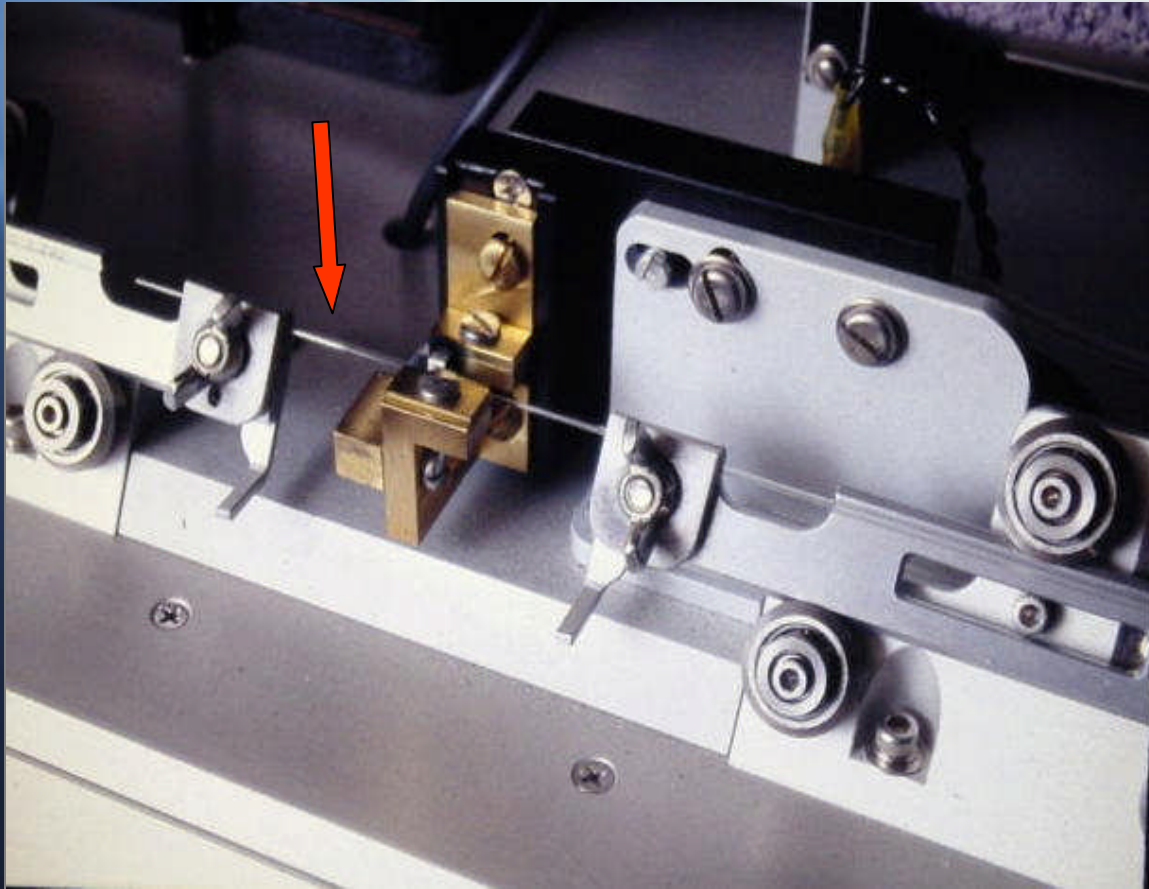
Panepinto sling



Microtome



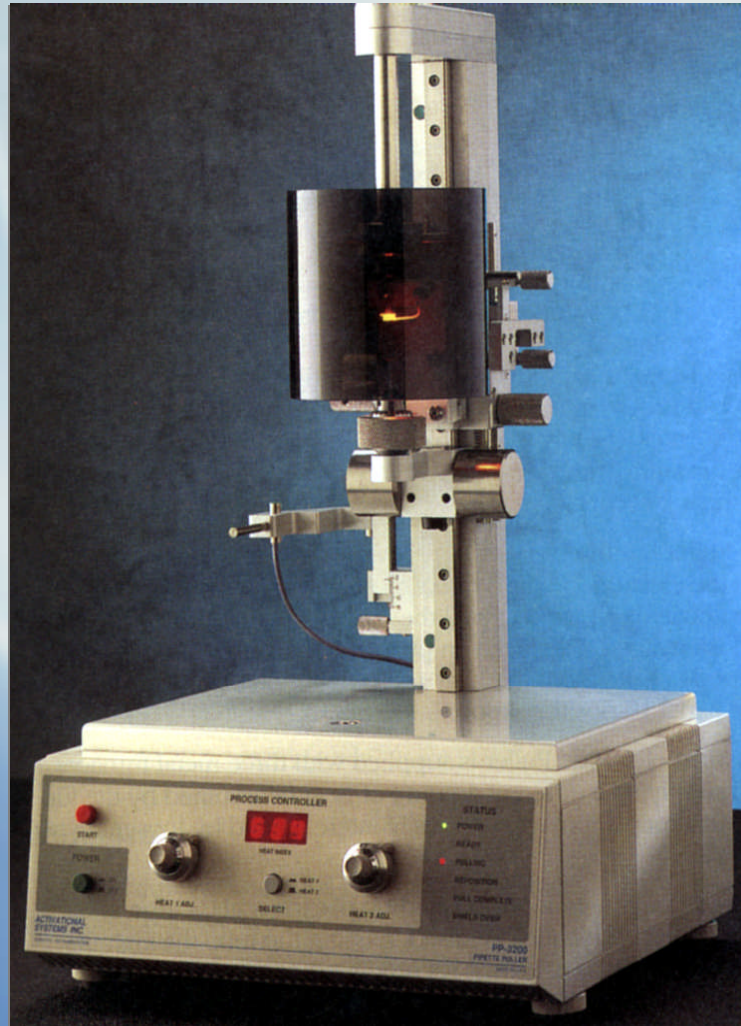
Pipette puller



**Used to made fine
tips for micro-
injection pipettes**



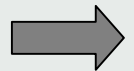
Pipette Puller



Dounce Homogenizer



Tissue/Cell disruption



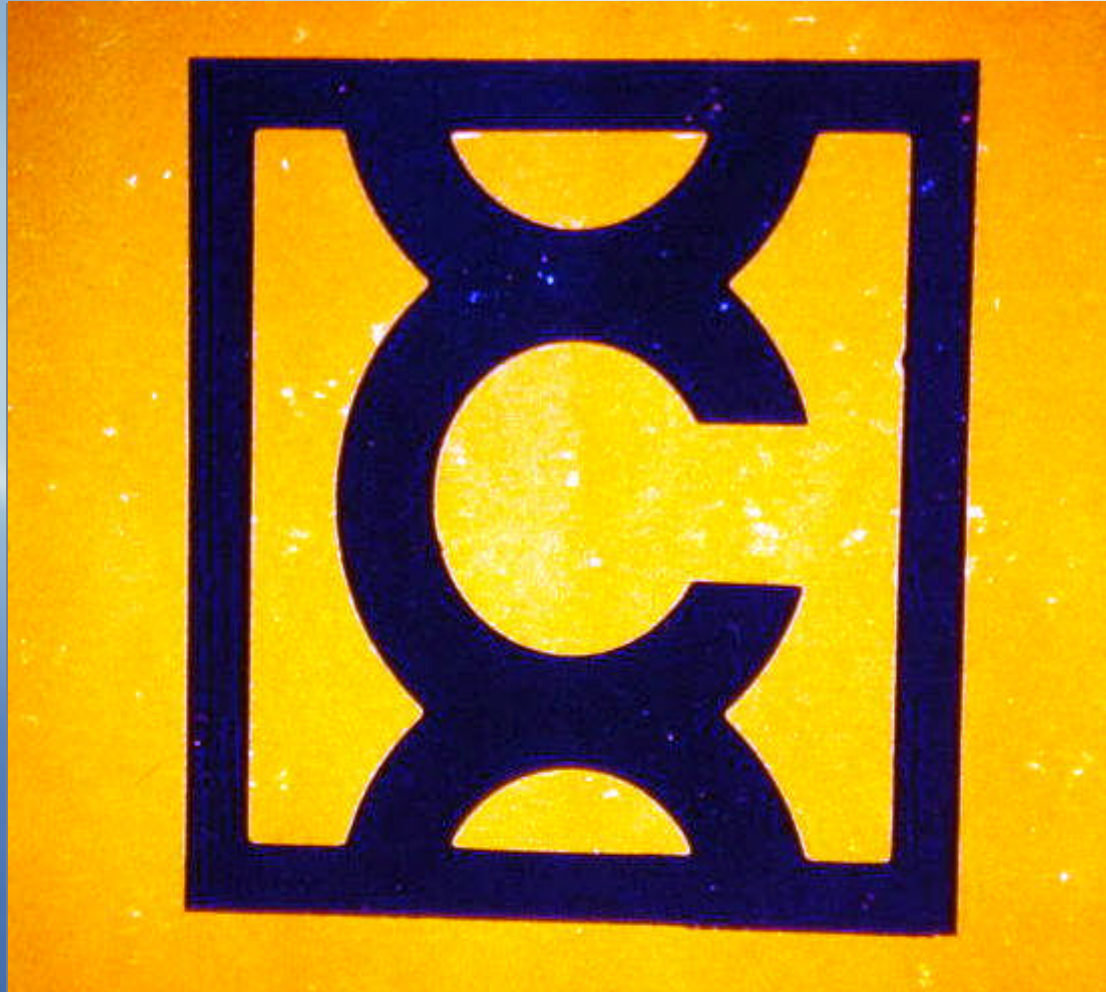
Tissue Homogenizer



- Tissue grinder



Cancer Hazard Label



Estrous Cycle Monitor – Impedance Meter



- Changes in vaginal pH affect electrical impedance



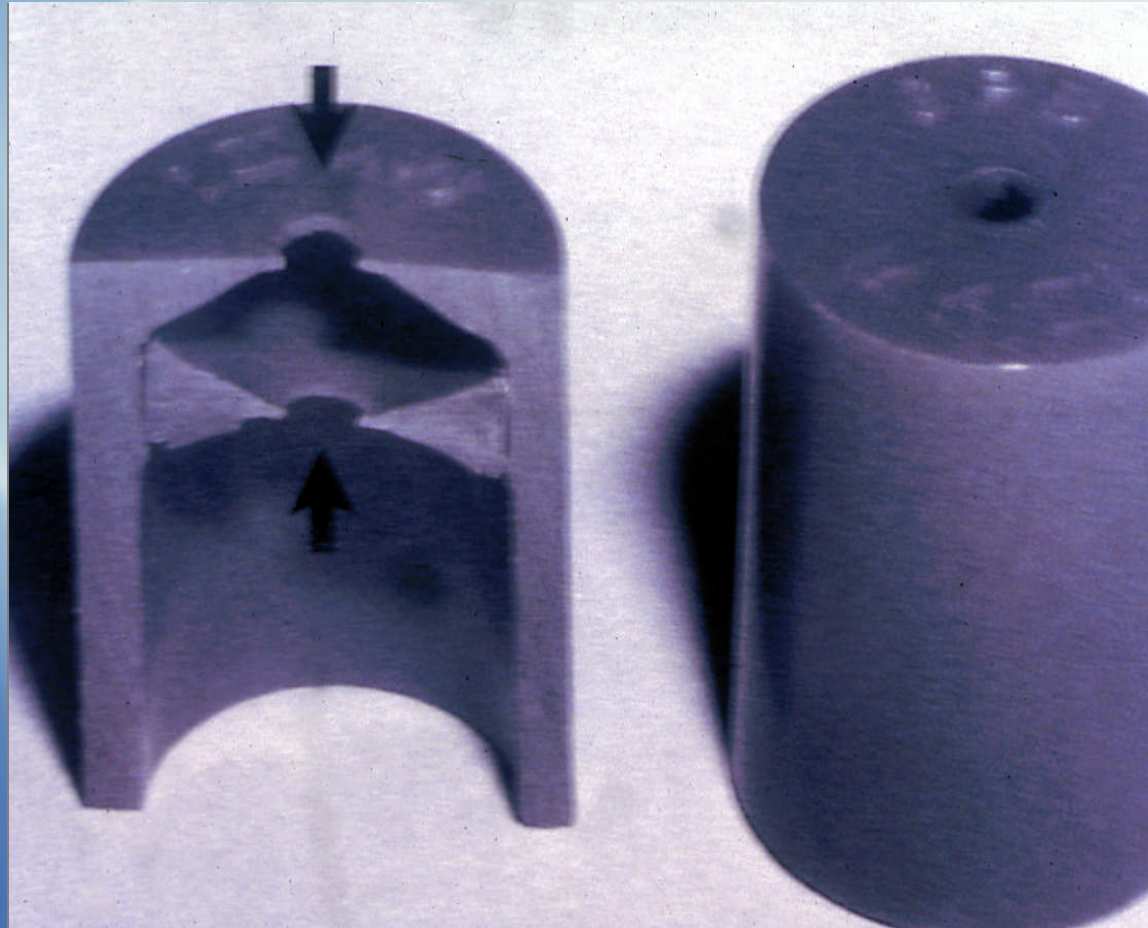
Hot Bead Sterilizer



- Warm-up time = 20 min
- Working Temp. = 250° C (approx. 500° F)
- Sterilization time = 20 sec



BAAM
(Beck Airway Airflow Monitor)



Aids in blind intubation of rabbits – CT 34(5)



Microinjection station

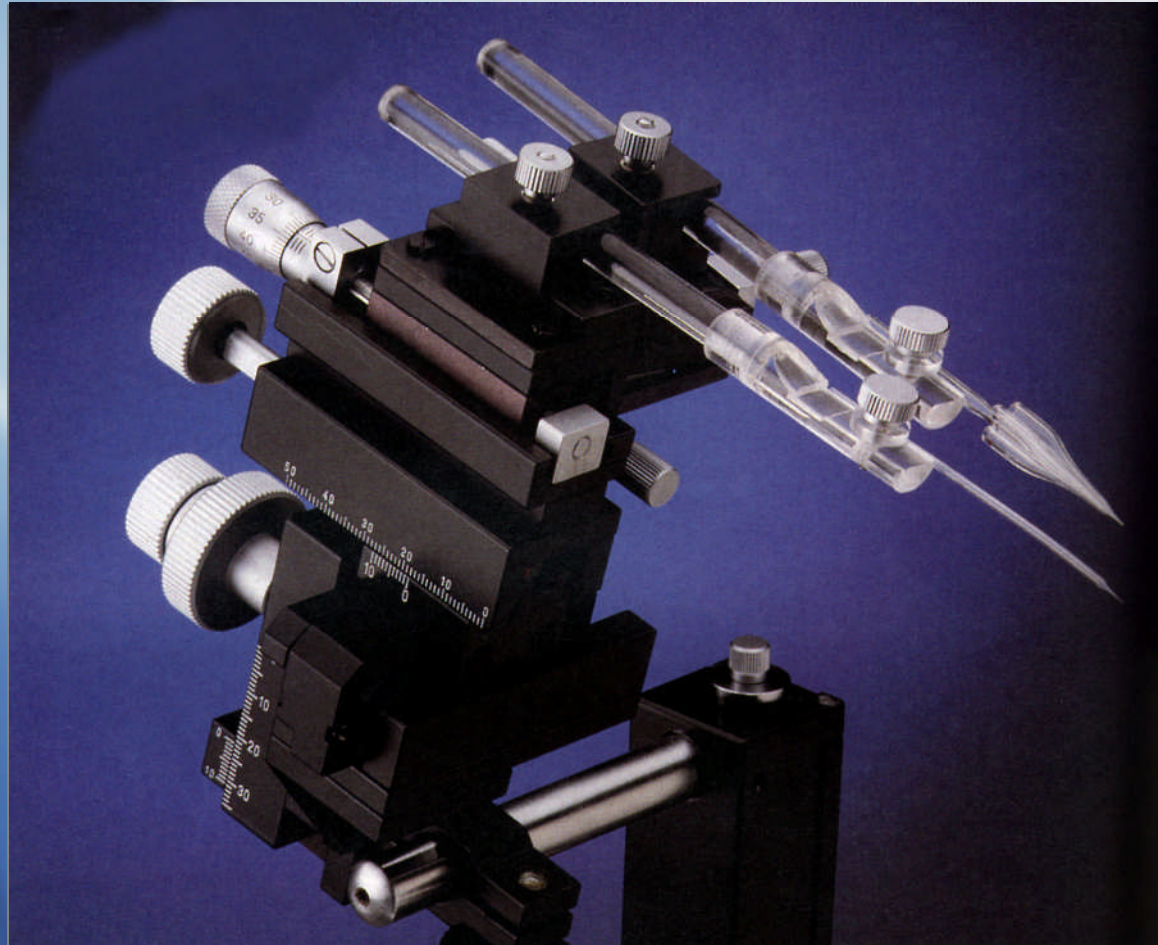


Micromanipulator

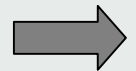
- Used for microinjection of ova or embryos



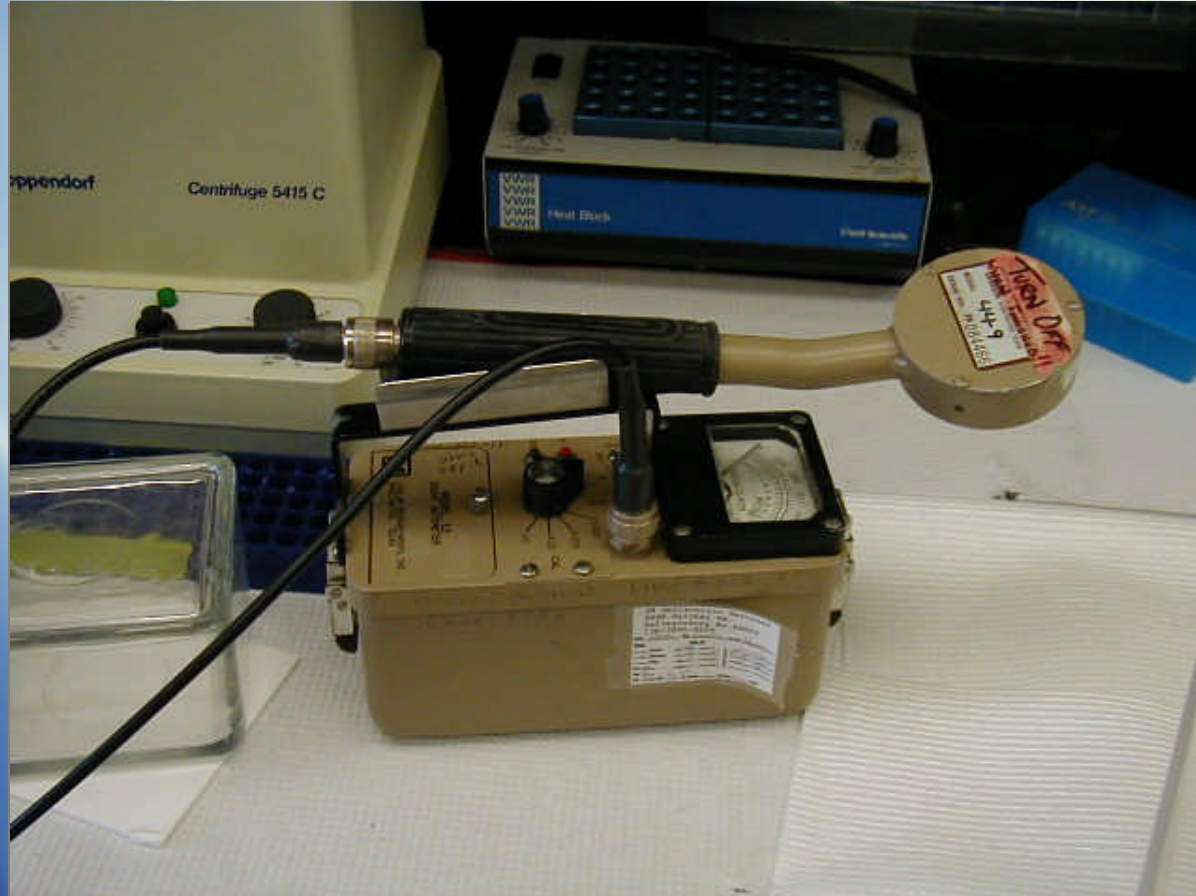
Micromanipulator



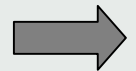
PAPR – Powered Air Purifying Respirator



Geiger counter



Ear Punch-Notch



Sterrad Plasma H₂O₂ Sterilizers



Rodent Hot Plate Test



- **Measures latency of stereotypic paw lick response after placement onto hot surface (30-60⁰C)**
- **Analgesiometry**
- **Harvard Apparatus**
- **CT 43(3), May 2004**



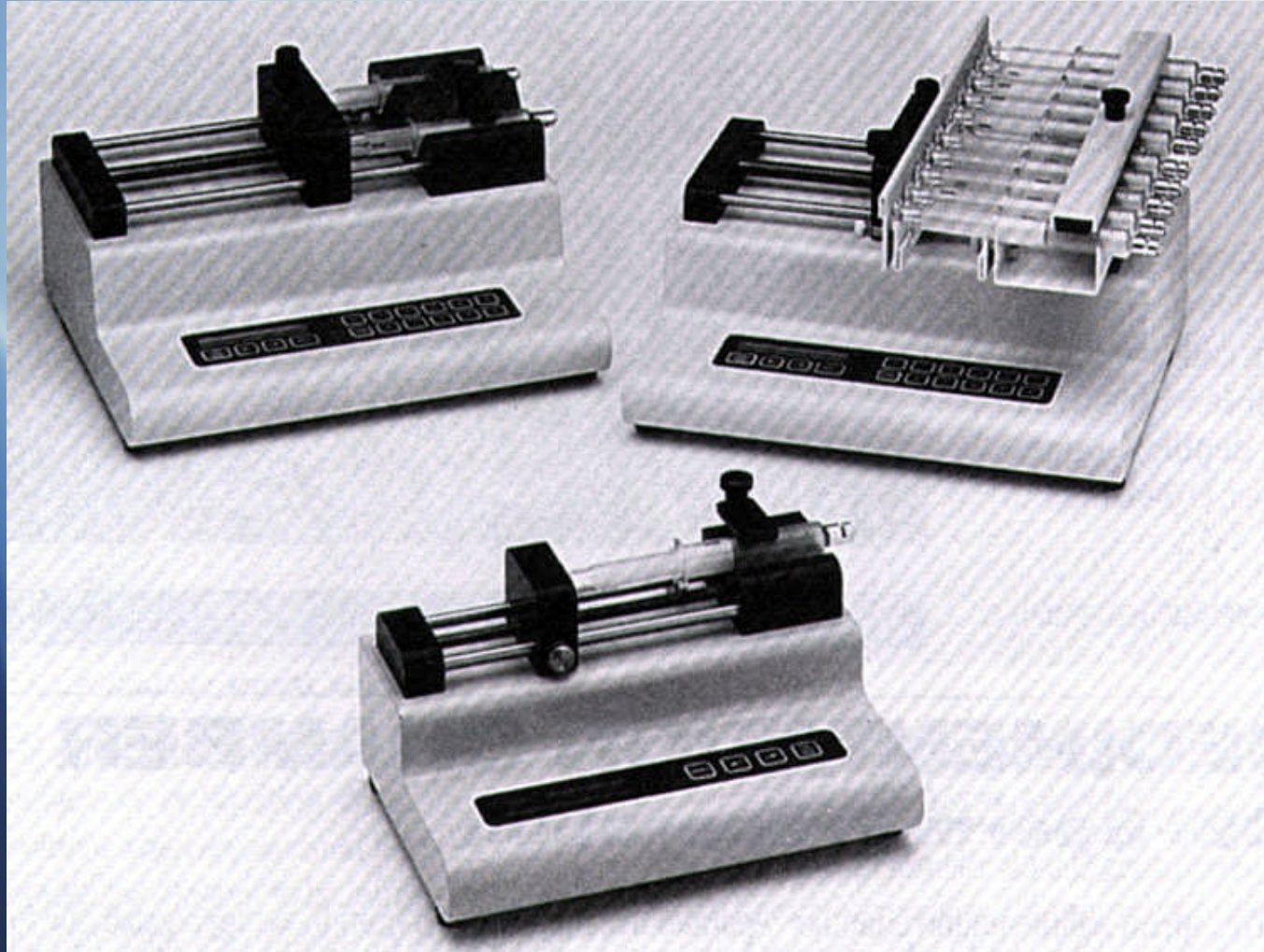
Rodent Tail Flick Test



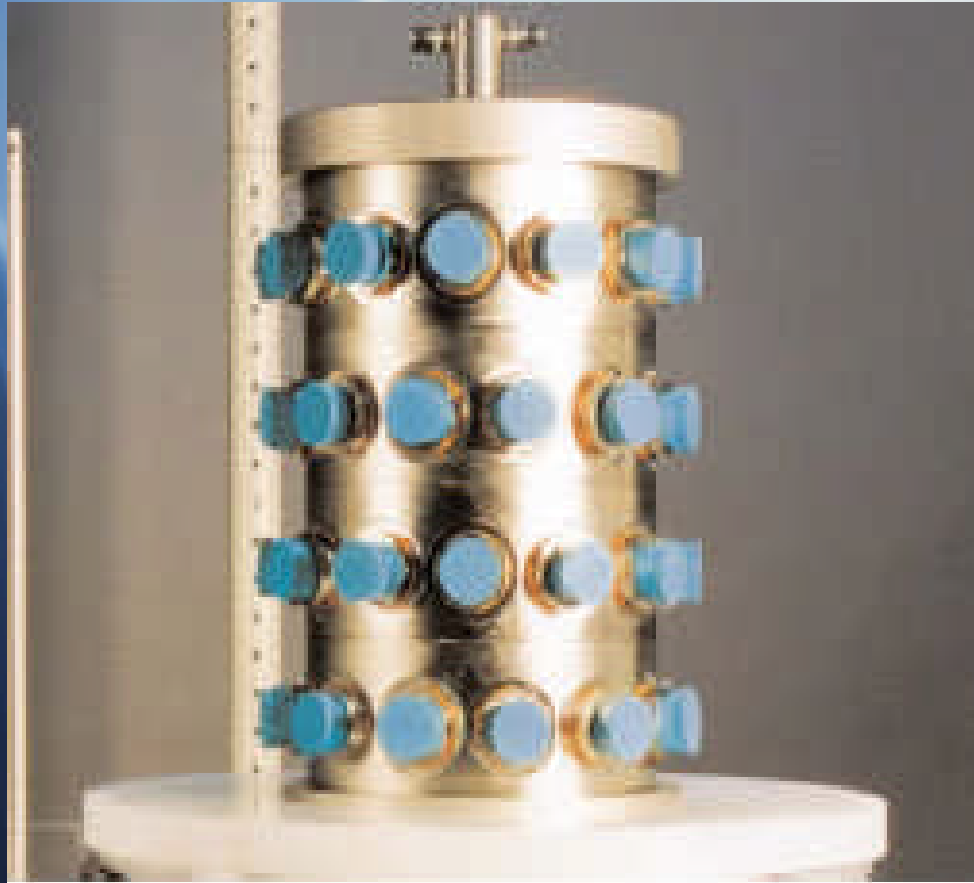
- **Adjustable light/heat source**
- **Tail movement from beam ends test**
- **Analgesimetry**
- **CT 43(3), May 2004**



Syringe Pumps (Microprocessor Controlled)



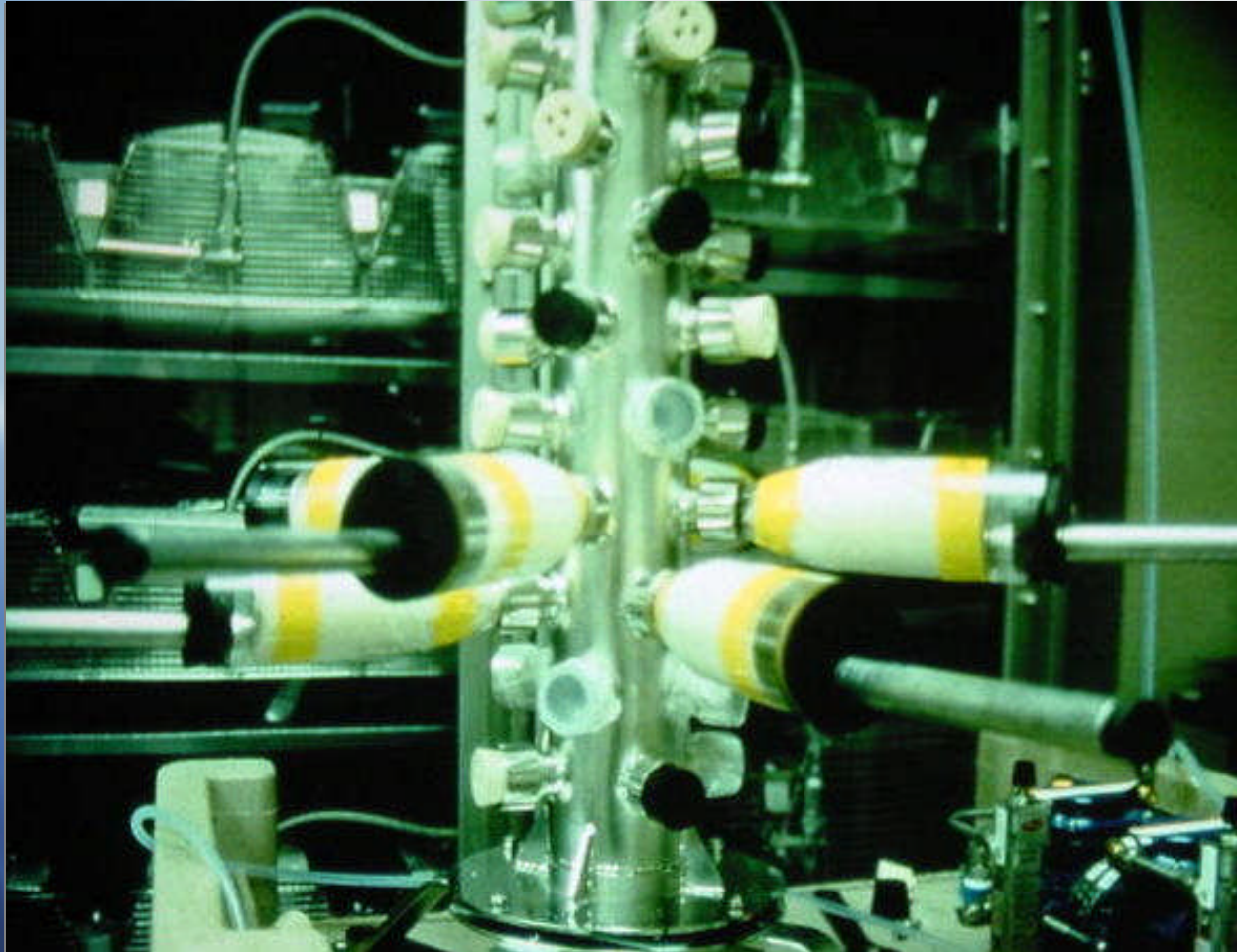
Nose Only Inhalation Exposure System



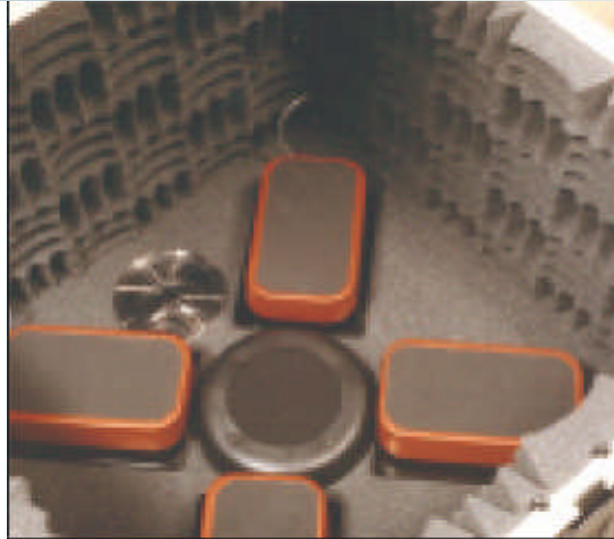
Animal Lab News
March 2006



Nose only inhalation chambers
Tail tube for thermoregulation



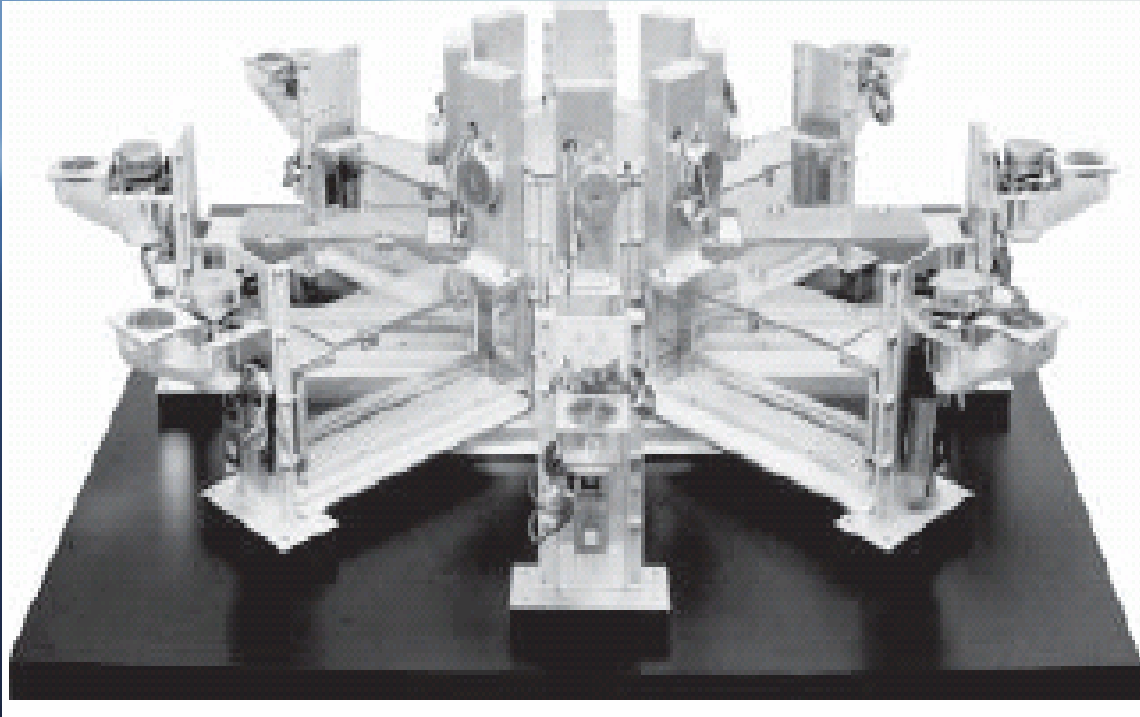
Acoustic Startle Apparatus



- CT 43(1),
Jan 2004

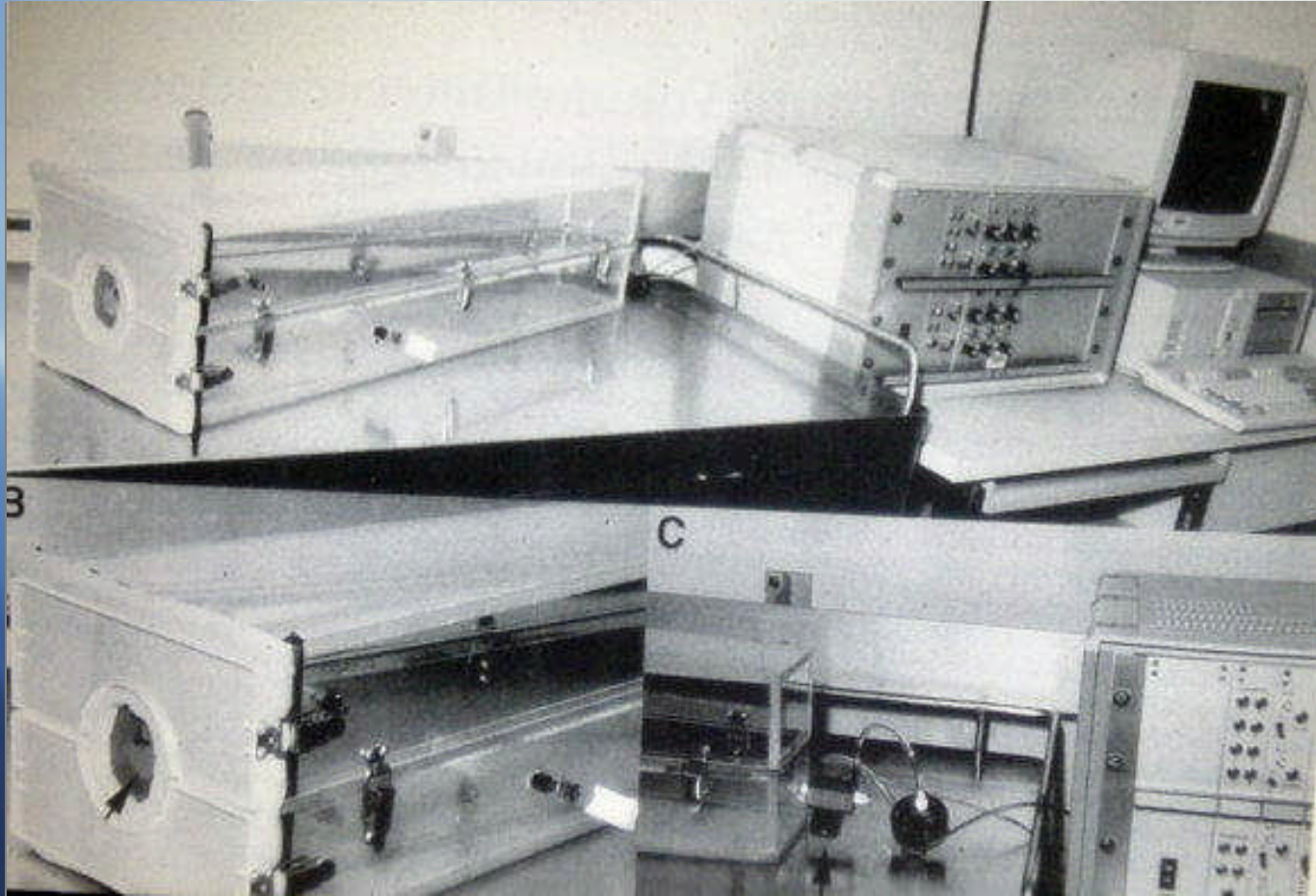


Rodent - Radial Arm Maze

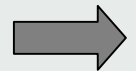


- Learning and memory
- CT 42(3), May 2003

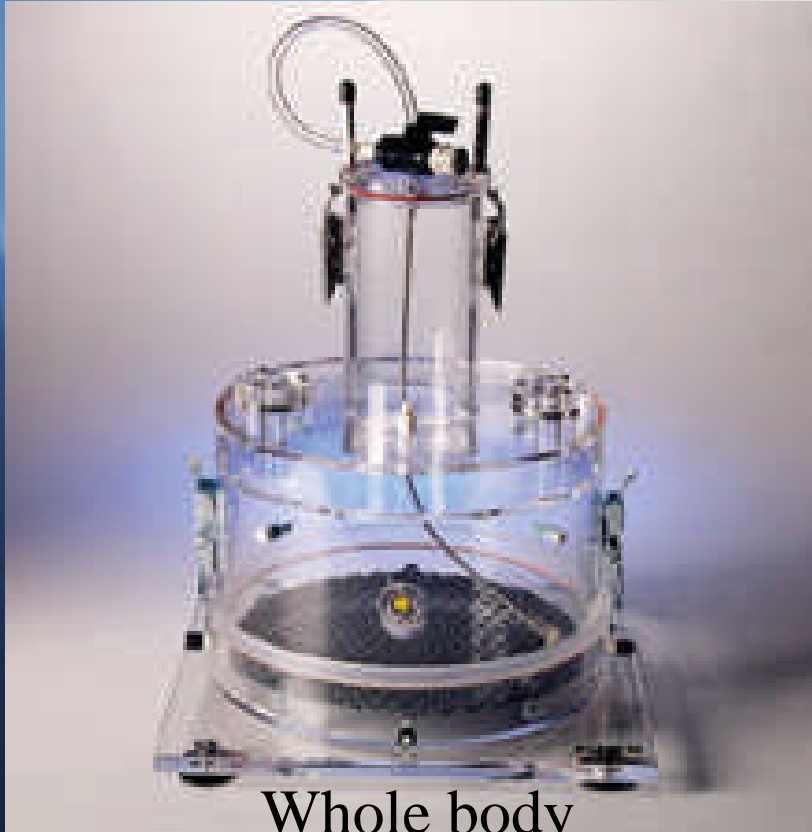




Non Human Primate

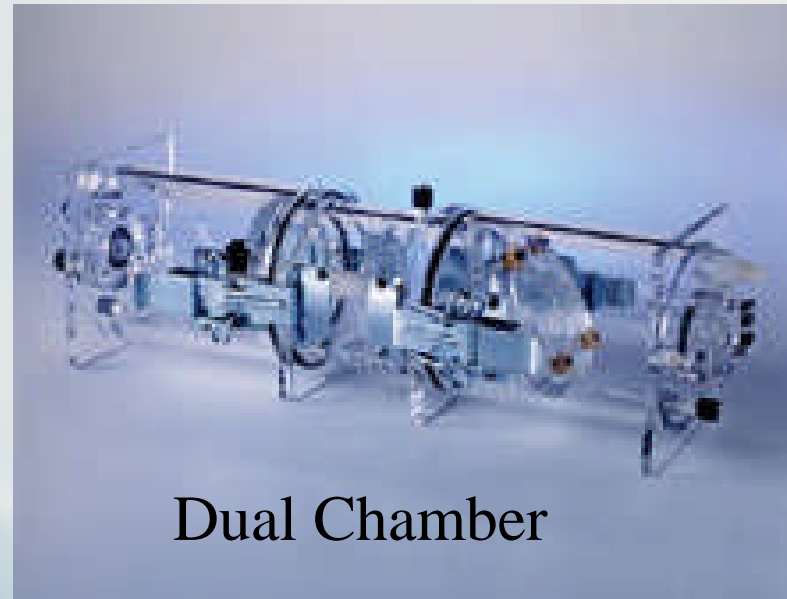


Plethysmograph



Whole body

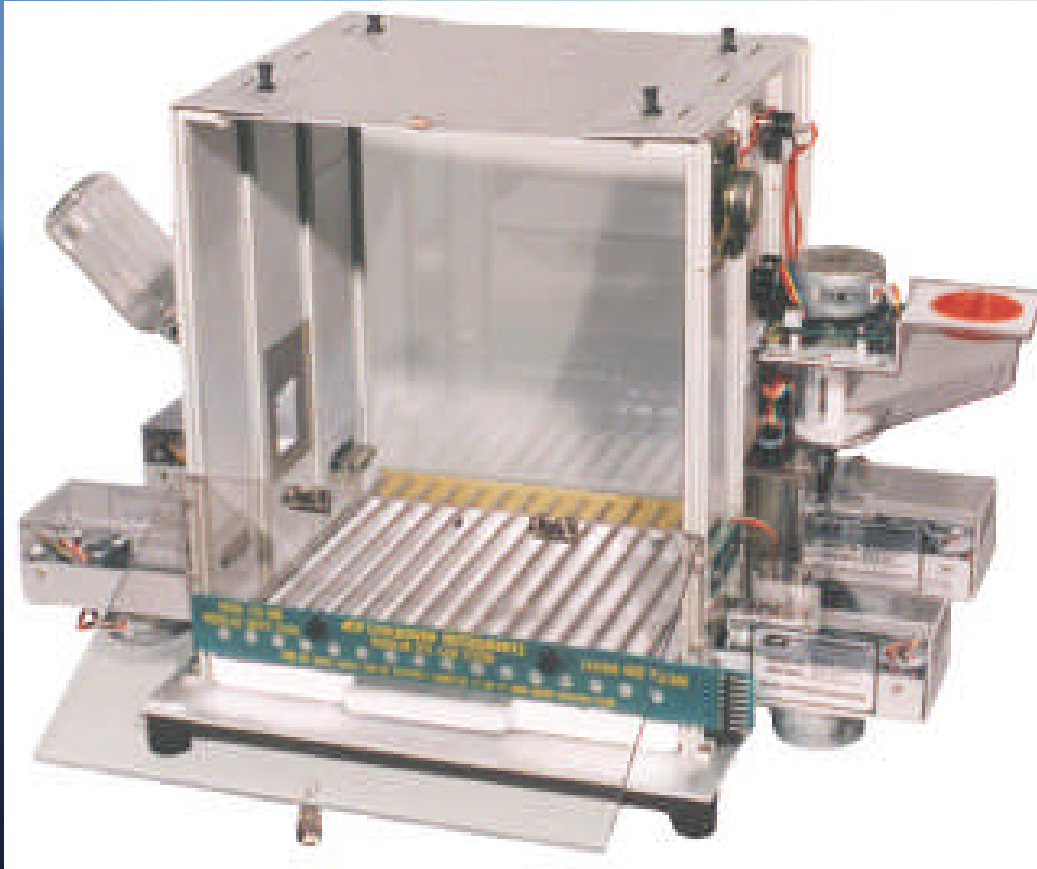
- Assess pulmonary function
- Minute volume
- Airway resistance
- Buxco, Inc. (www.buxco.com)



Dual Chamber



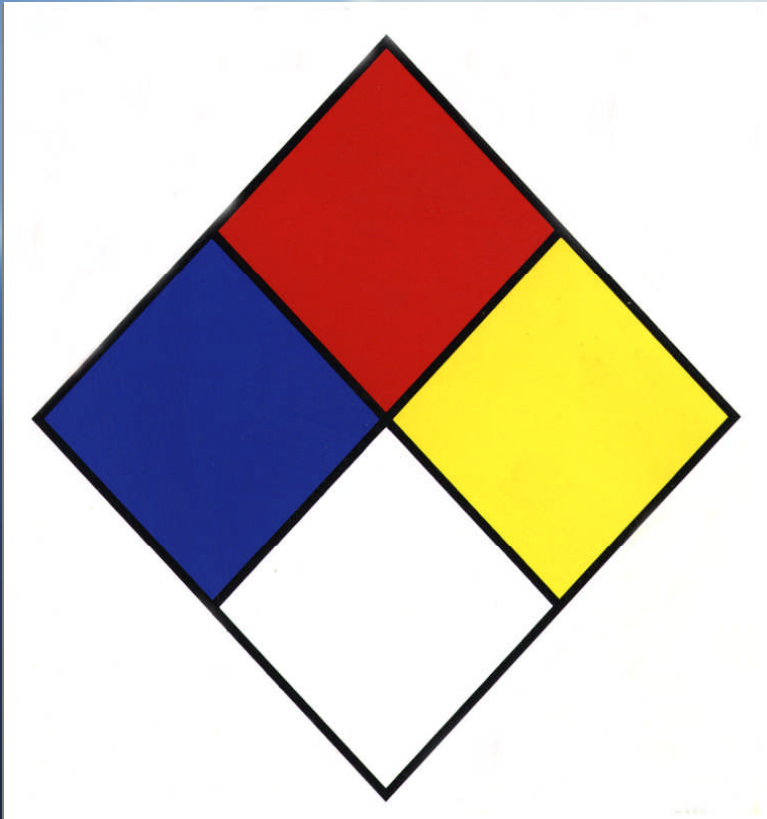
Rodent – Operant Chamber



- Skinner box
- Behavioral testing
- CT 43(4), July 2004



Chemical Hazard Label



National Fire Protection
Association (NFPA)

- **Red** = fire/flammability
- **Blue** = health
- **Yellow** = reactivity
- **White** = special notice



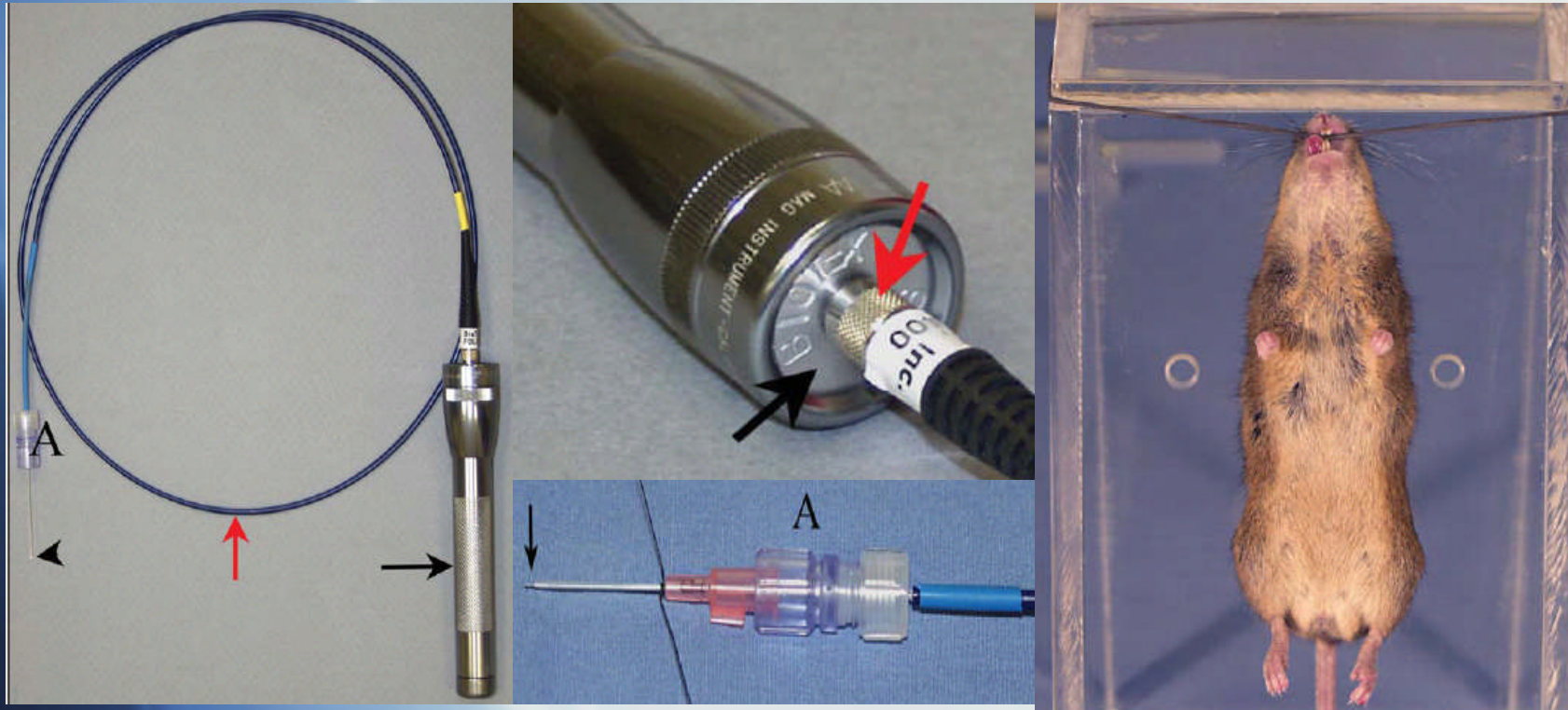
Rotorod



Measures motor coordination and fatigue



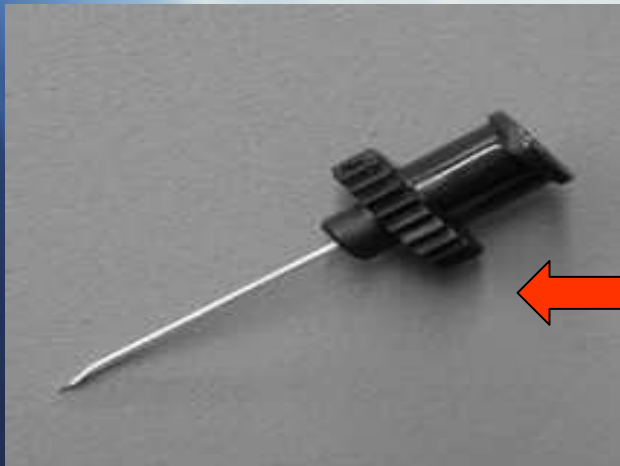
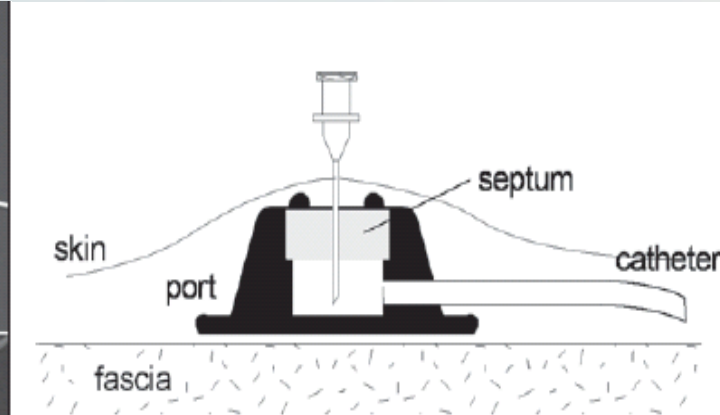
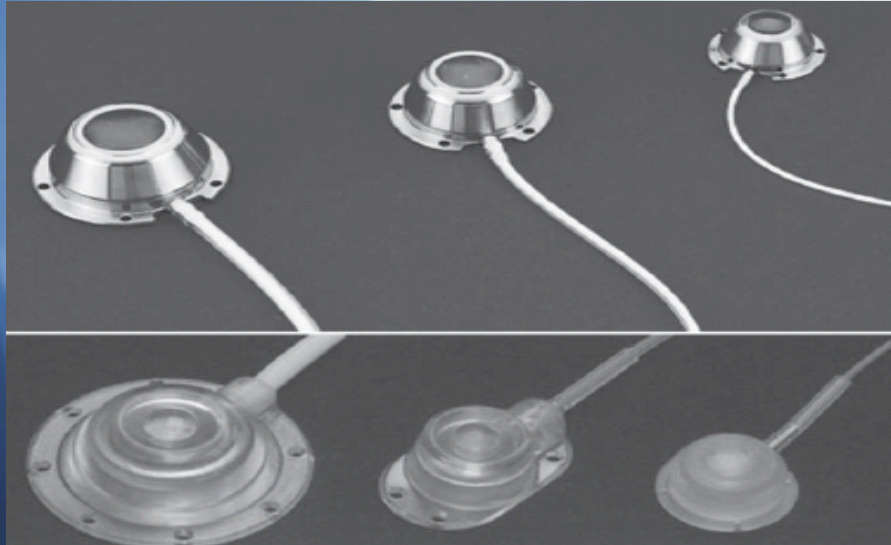
Rodent Endotracheal Intubation



- **Fiber-optic cable acts as ET tube stylet**
- **20-24 ga IV catheter**
- **CT 44(2), March 2005**



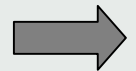
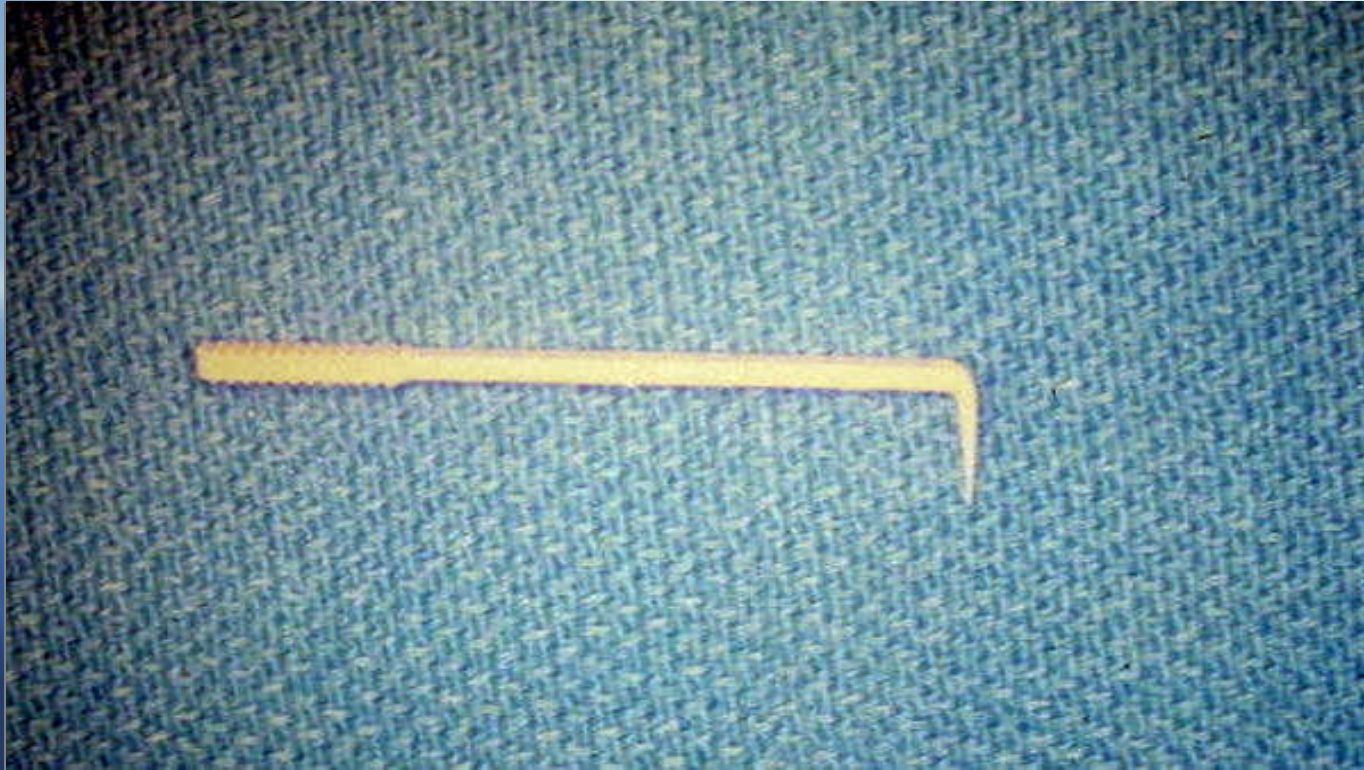
Vascular Access Port - VAP



- Huber needle (non-coring)
- CT 44(3), May 2005 Review



Catheter introducer



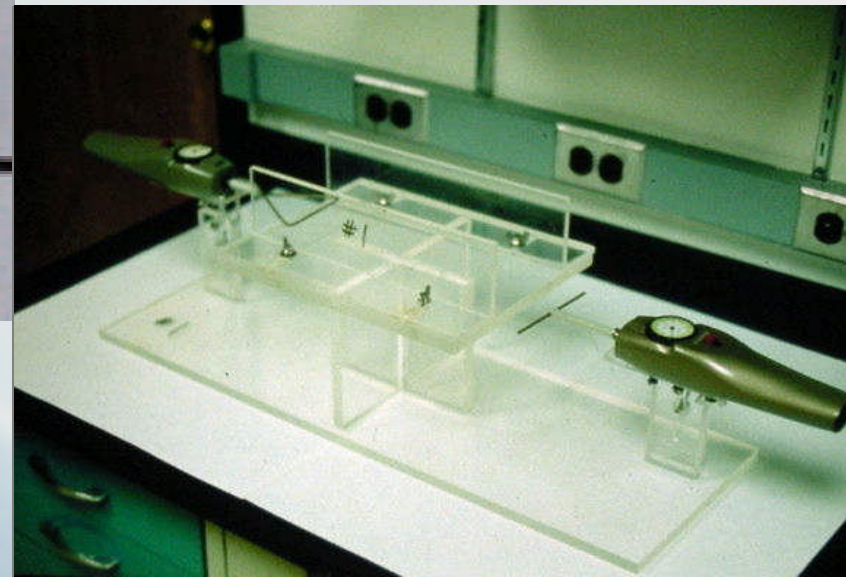
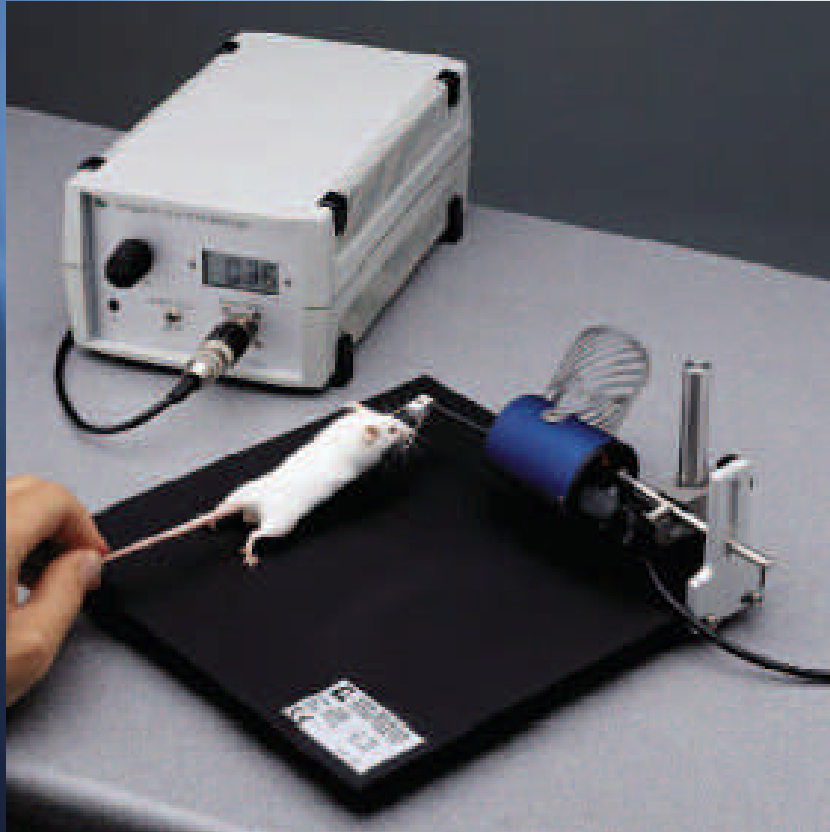
Coronal Brain Matrices



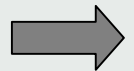
- Specific brain sectioning
- Harvard apparatus
- JAALAS 45(1), March 2006



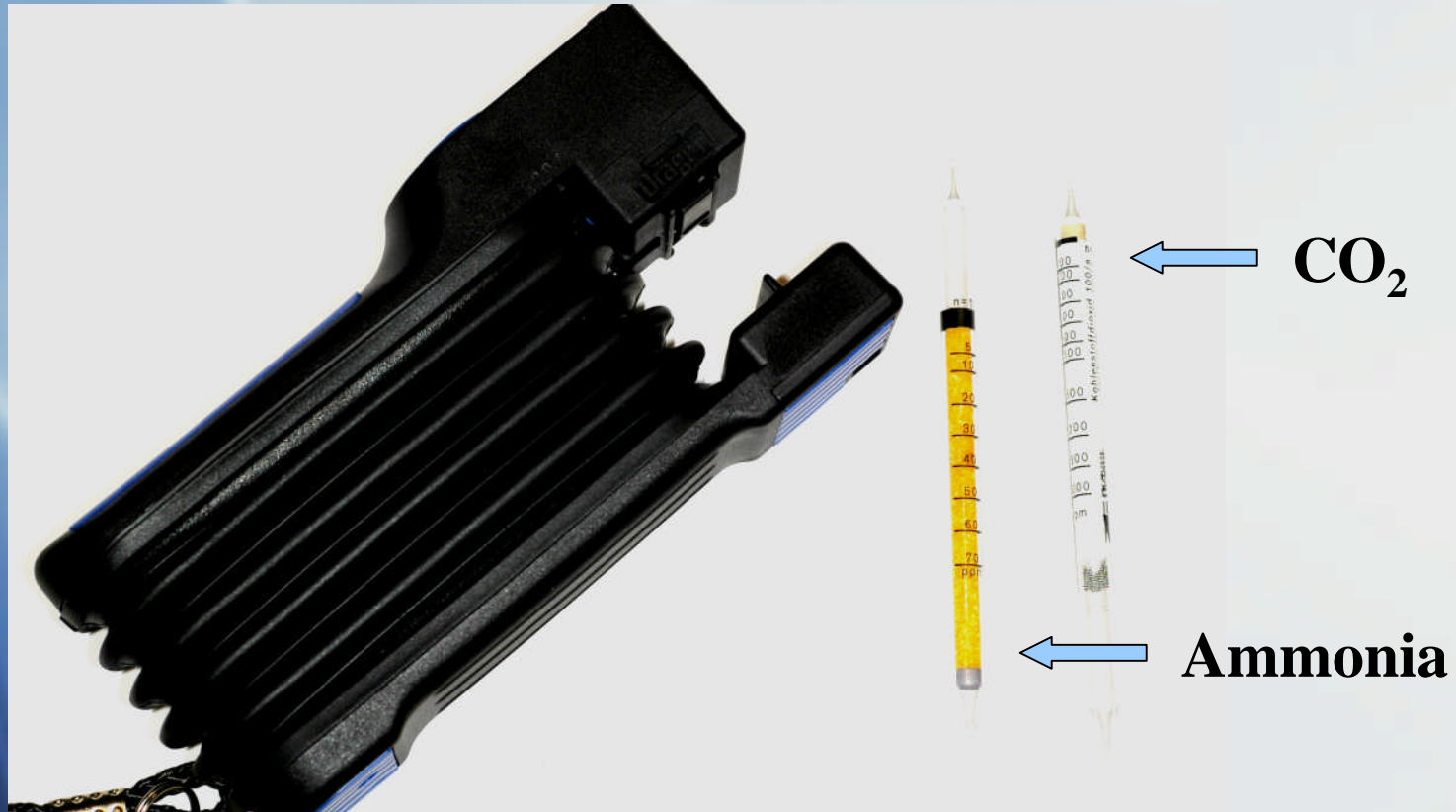
Rodent Grip Strength Meter



Stereotaxic Instrument



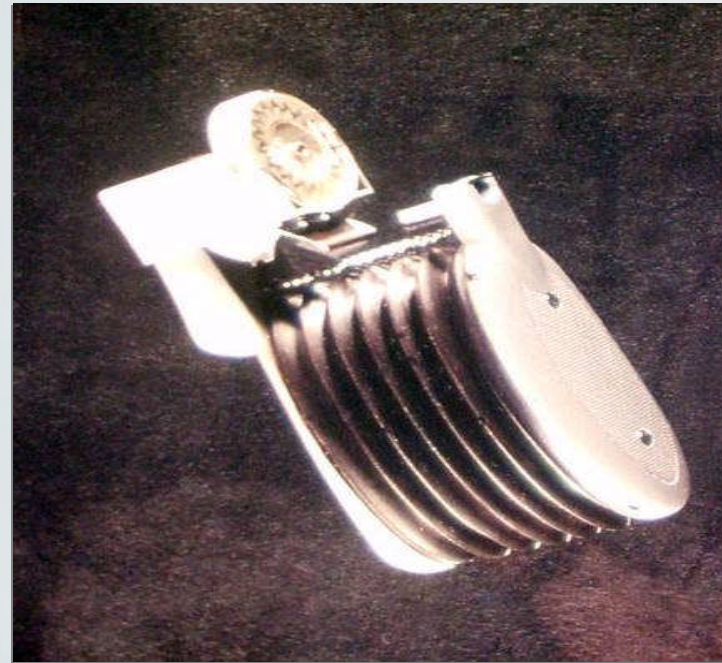
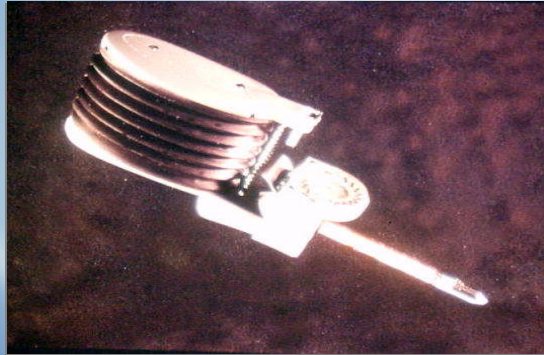
Dräger Gas Detection pump



- **Manual gas measurement device**



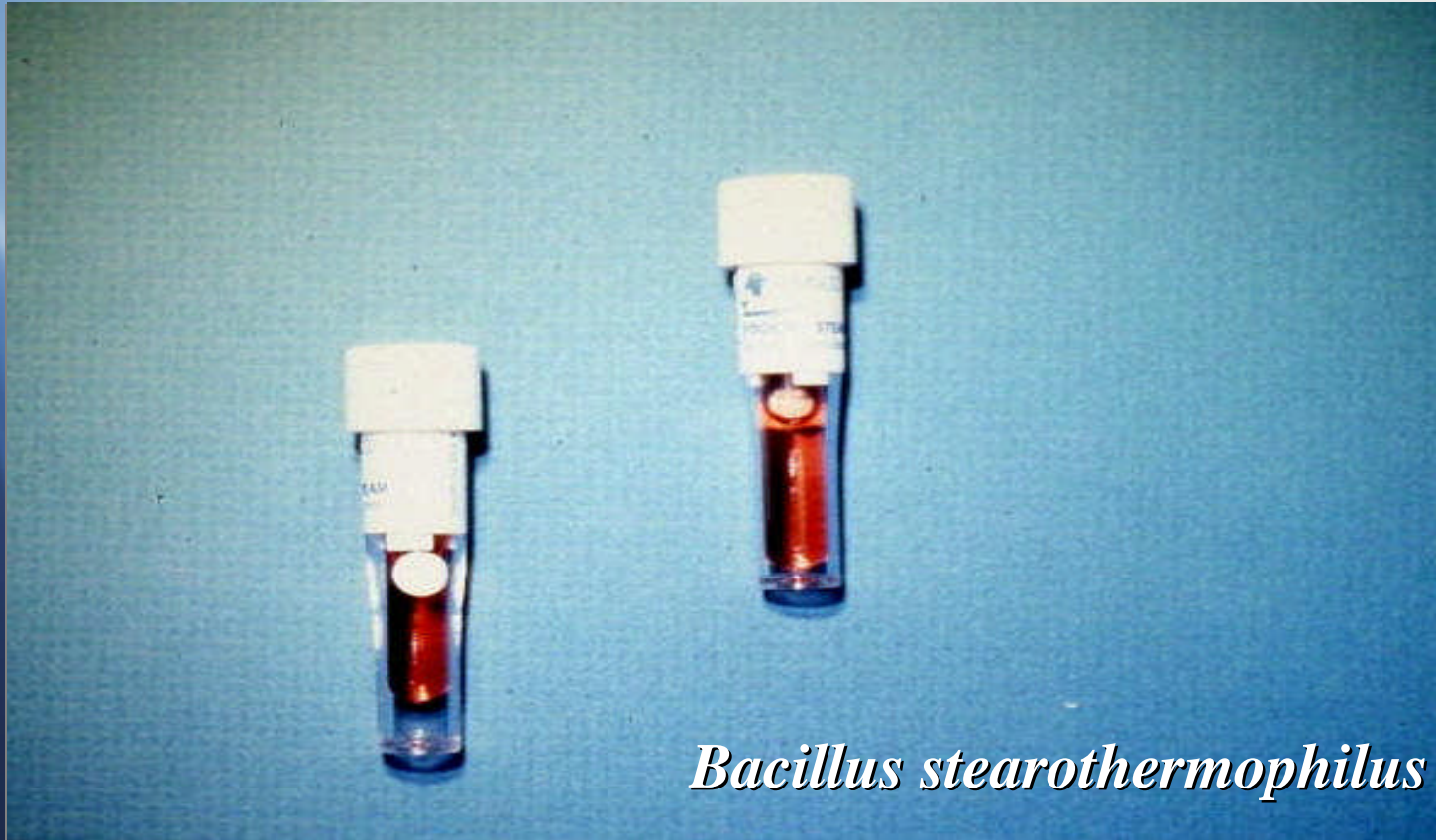
Dräger – Gas Detector Pump (Old)



Dräger Gas Monitor (Electronic)



Biological indicator – Steam Sterilization



Bacillus stearothermophilus



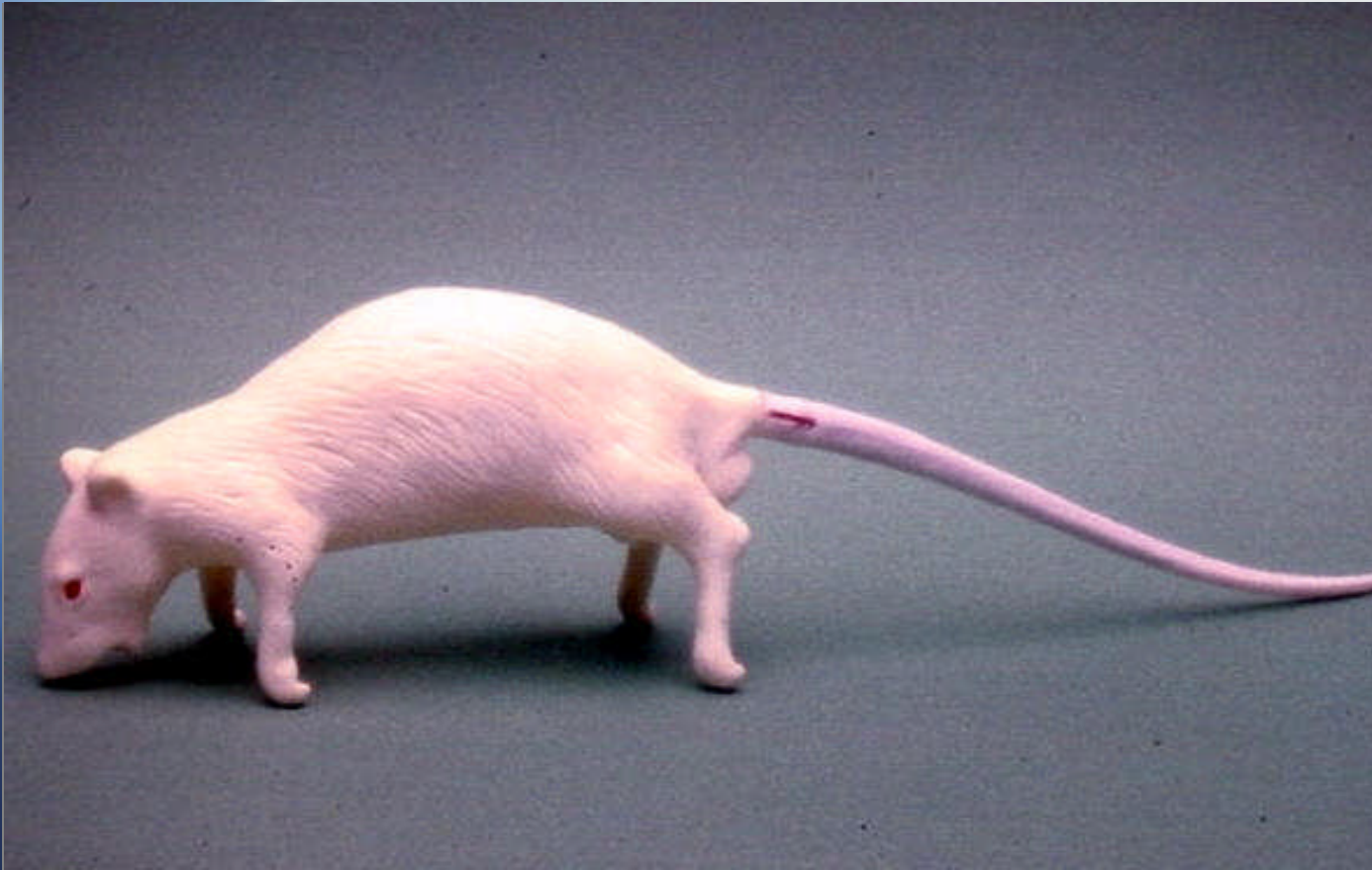
Ethylene Oxide (ETO) Biological Indicator



Bacillus subtilis



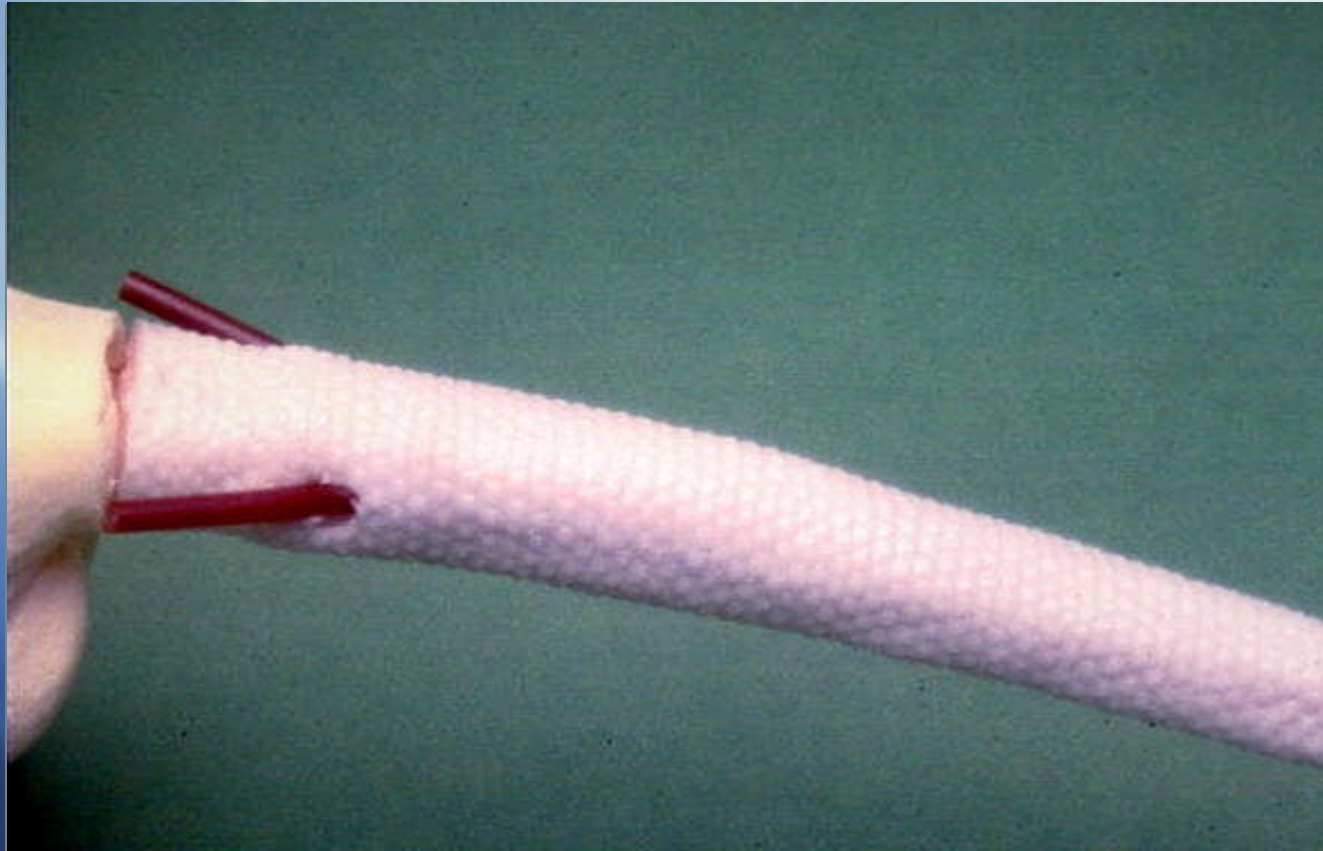
Koken Rat



Non-animal teaching model - Alternative



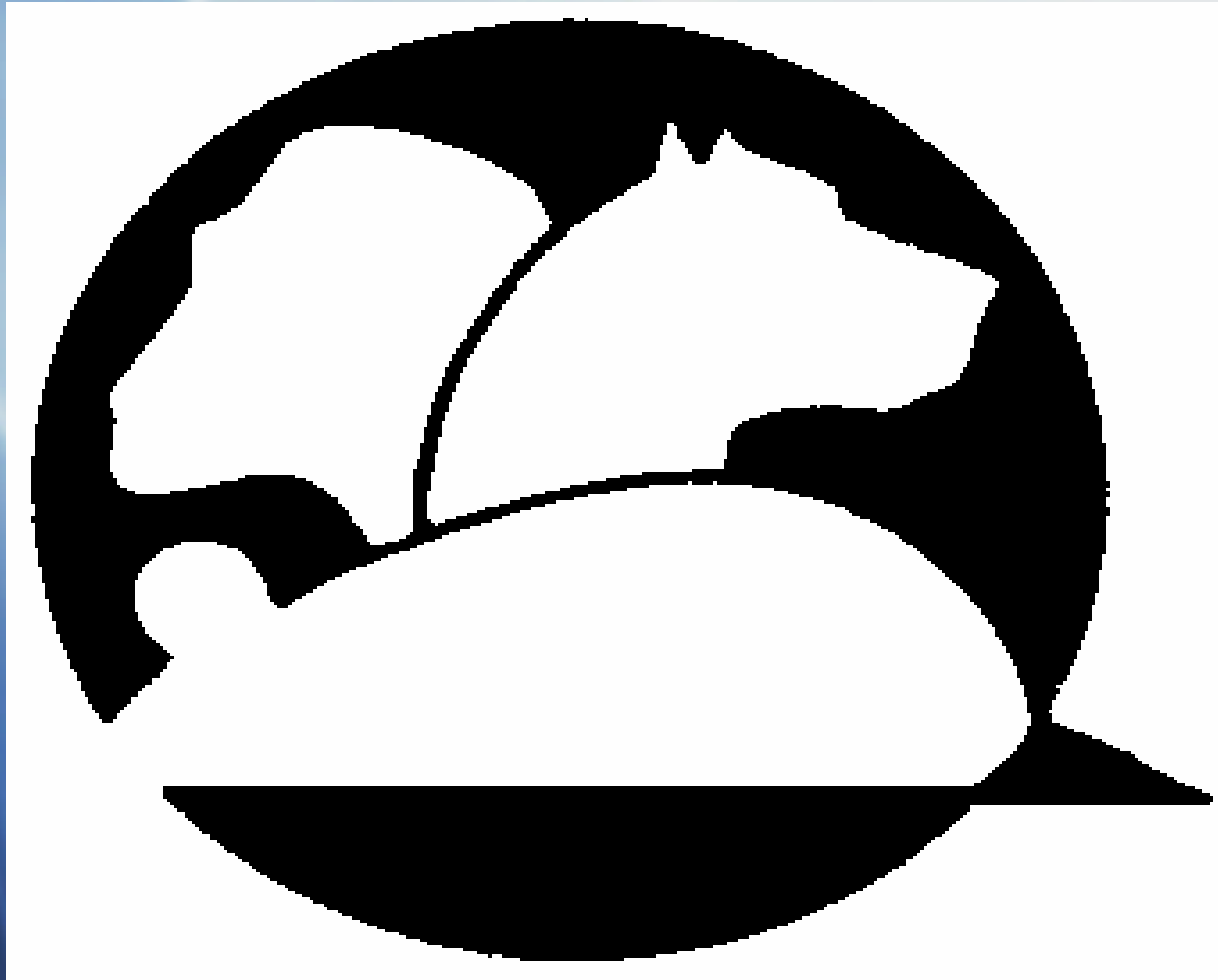
***Koken rat tail
showing blood vessels***



Parabiosis

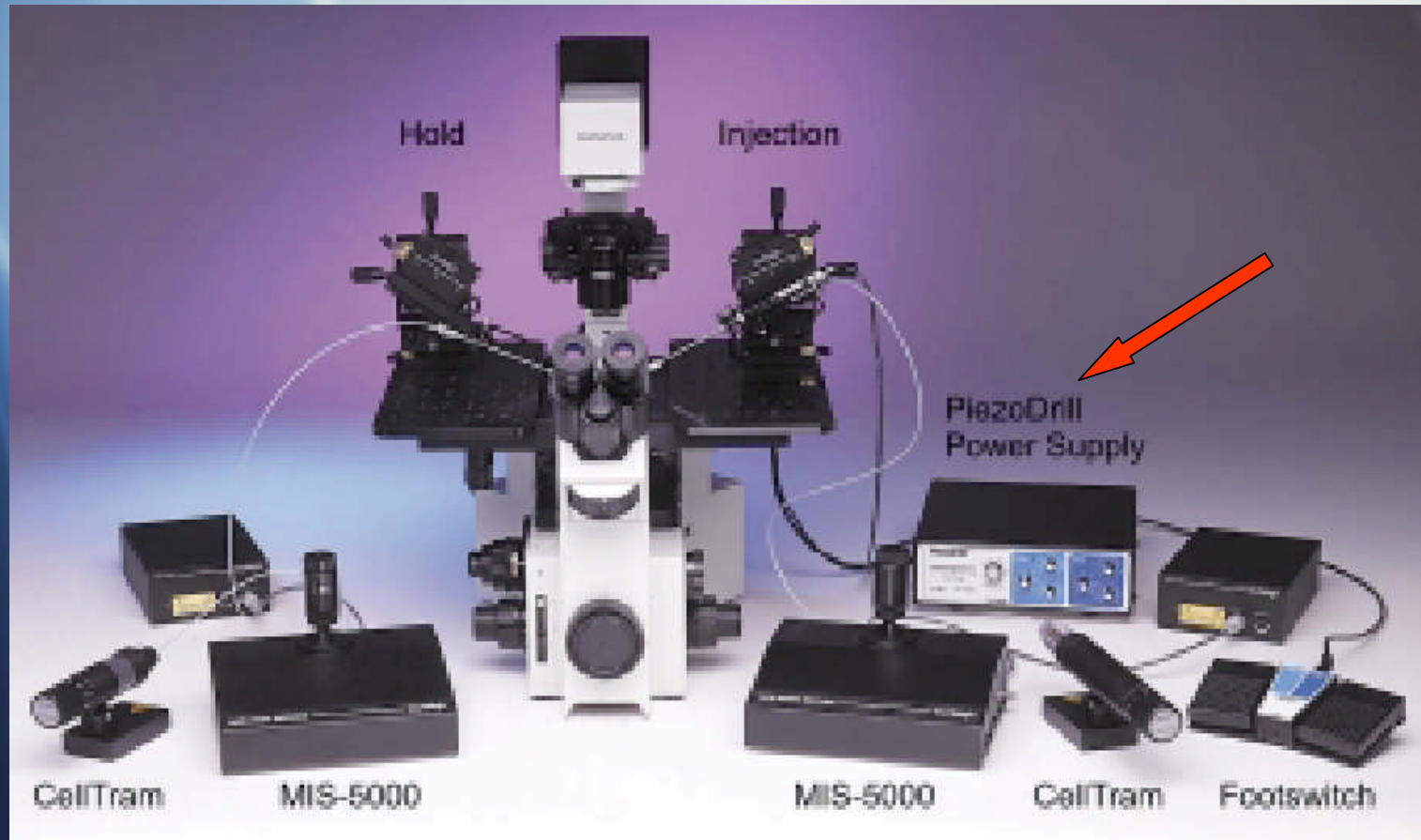


*ACLAM (American College of Laboratory
Animal Medicine) symbol*



ICSI

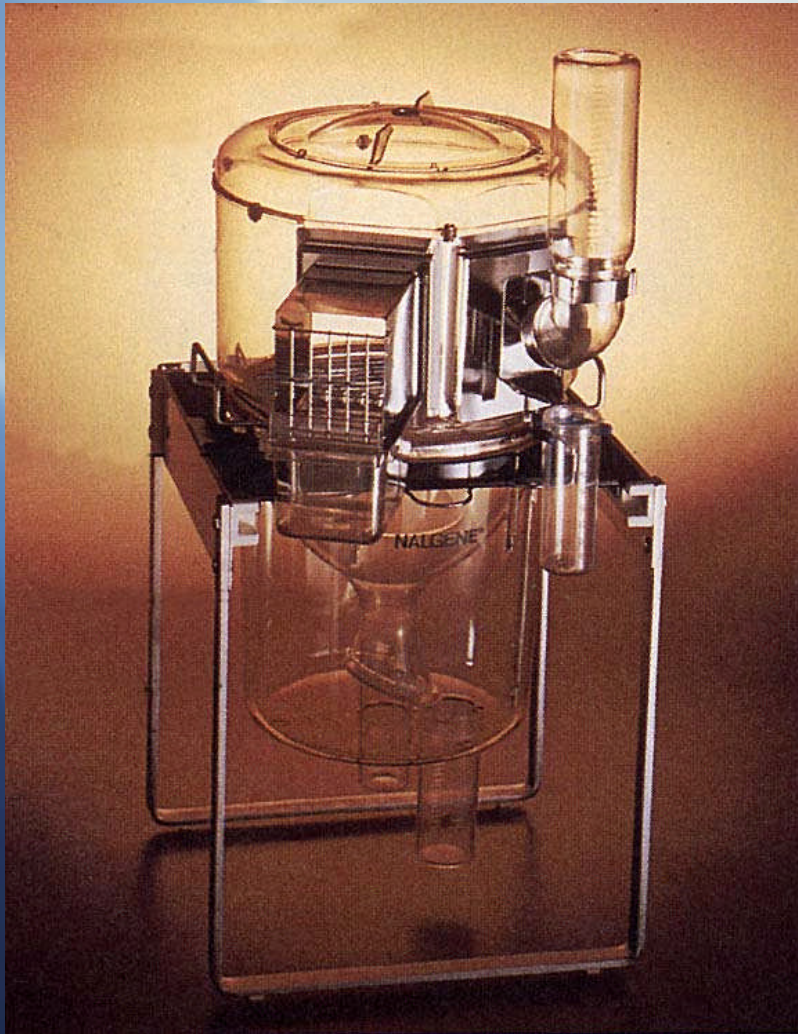
Intracytoplasmic Sperm Injection



Comp. Med. 53(3), June 2003



Rodent Metabolism Cage



Measures food & H₂O
consumption, and collects &
separates urine & feces



Large Animal Metabolic Cage



Individually Ventilated Cage (IVC) System Air Handling Unit



•Tecniplast



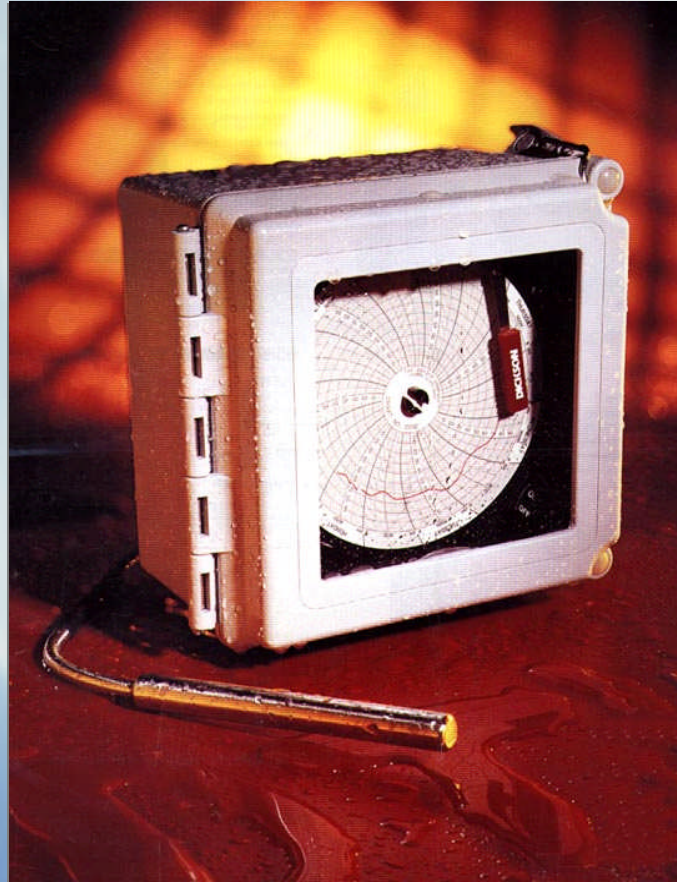
Water Bottle Filler



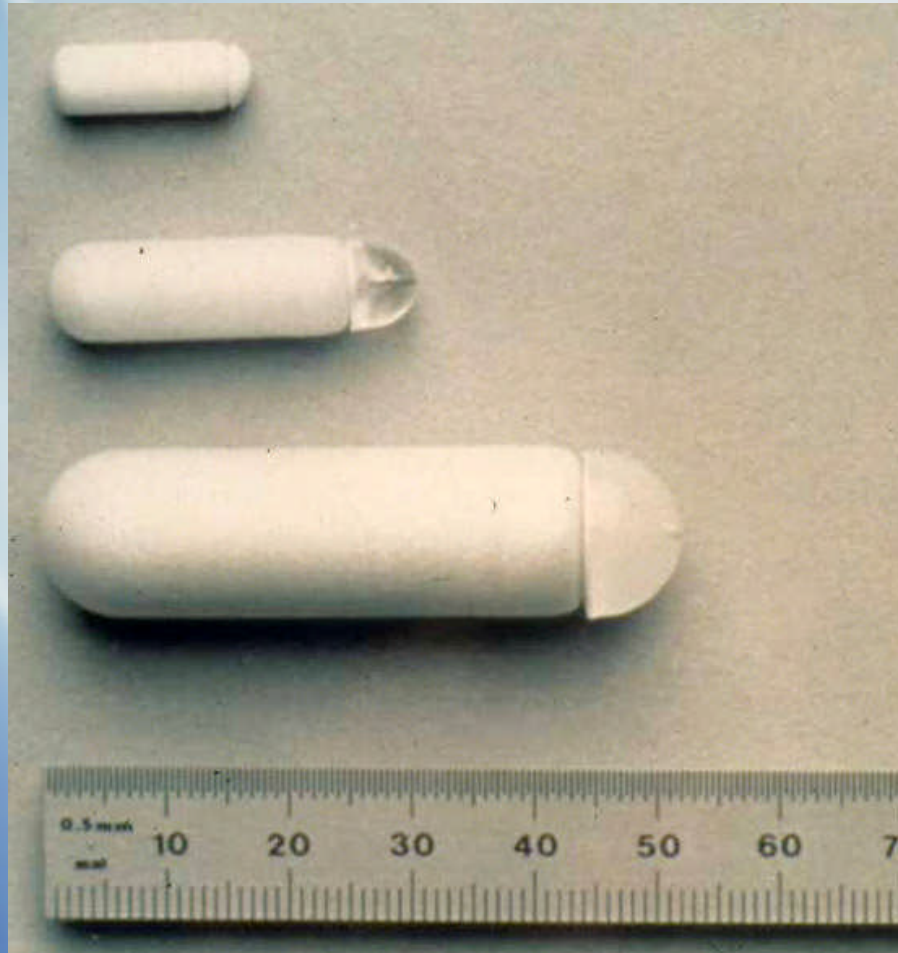
Automatic bedding dispenser



Temperature/Humidity Recorder



Alzet Osmotic Pumps



Implantable drug delivery system driven by osmotic pressure



Rack Water System Flushing Station



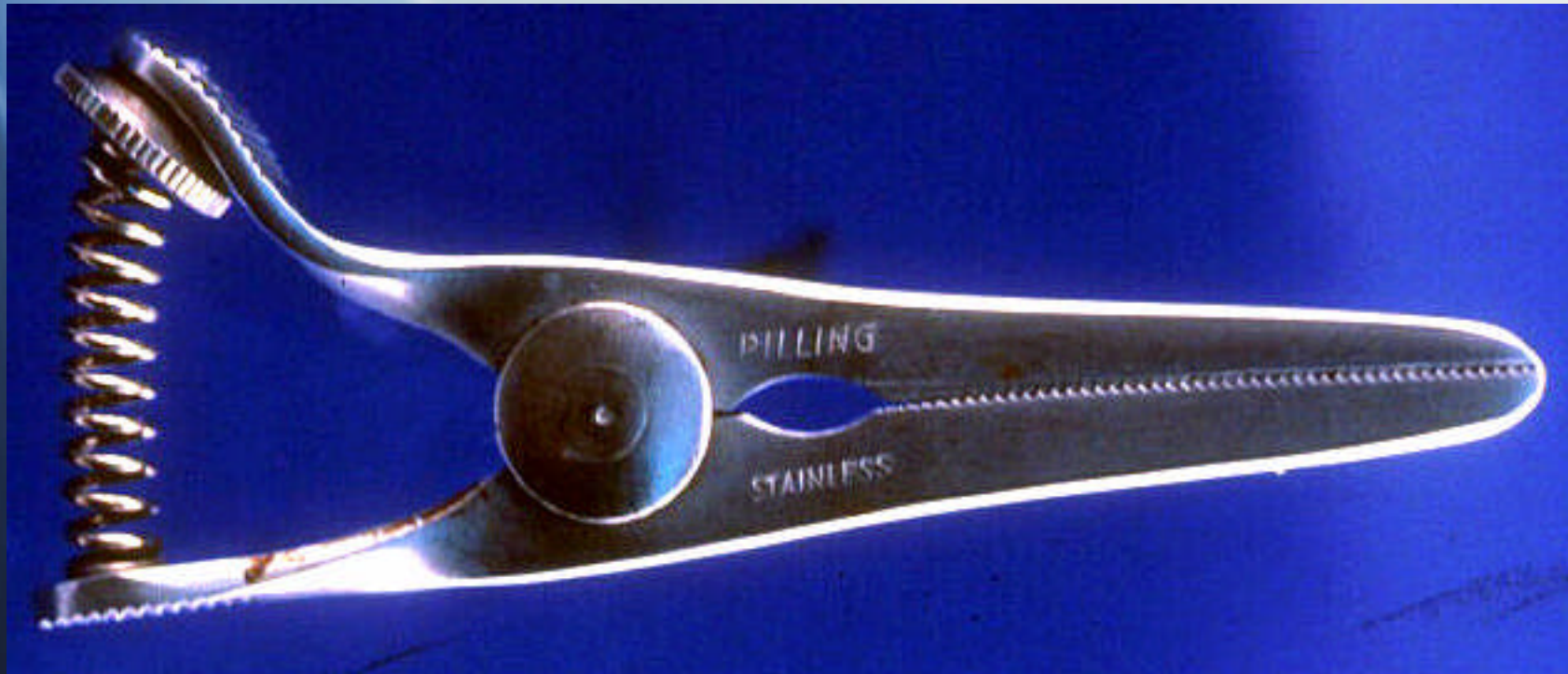
Acoustical Panels



- Noise reduction - ~10 dB
- Lab Products, Inc.



Bulldog Vascular Clamp



DART test

Daily Air Removal Test



- Tests autoclave vacuum



Luminometer



Measures ATP → contamination



Individually Ventilated Cages; Wall-mounted Blowers



(Illinois) Cubicle



Trexler – Flexible Film Isolator



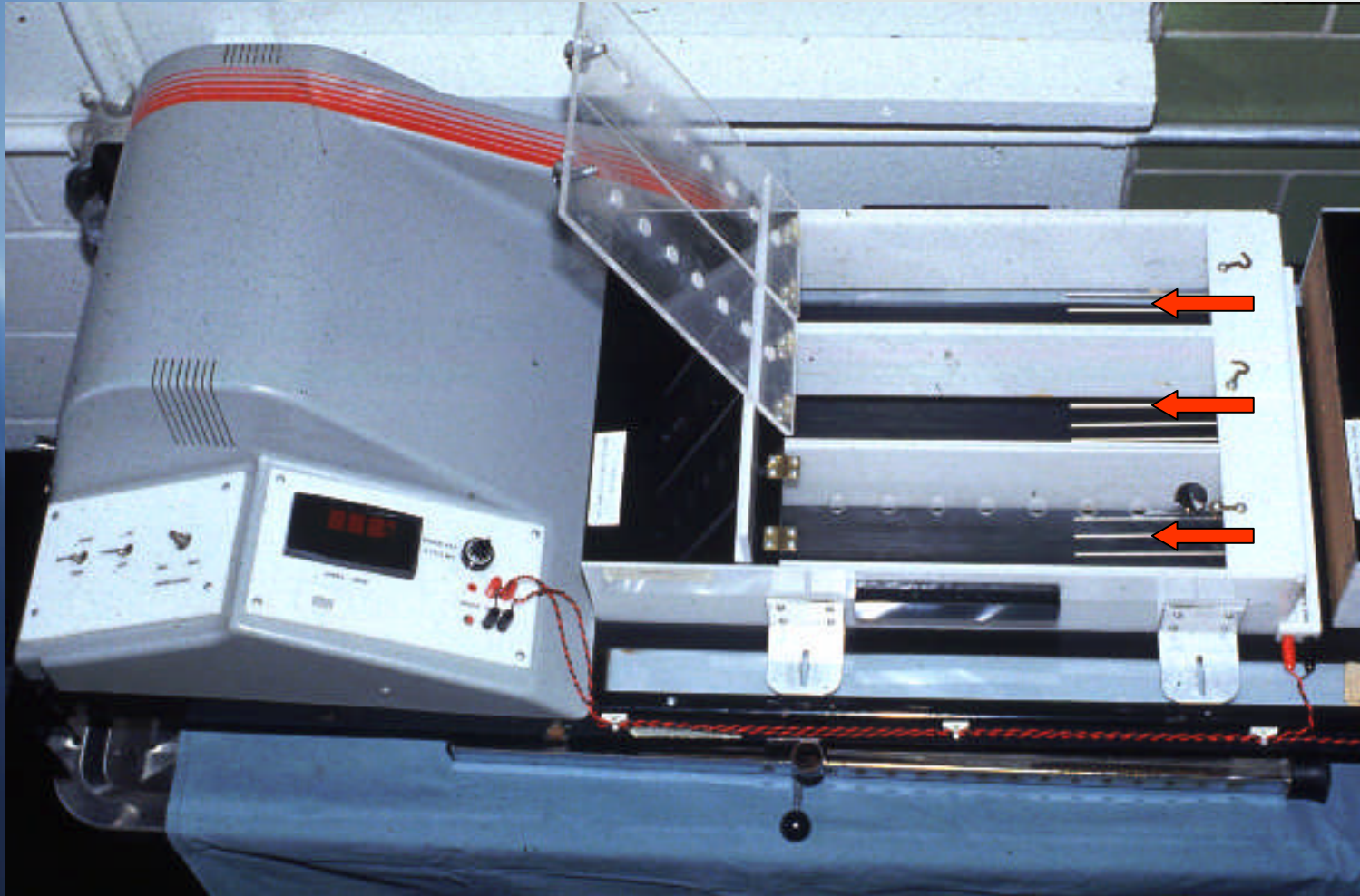
Sow farrowing crate



Animal Transfer Station



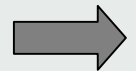
Rodent Treadmill: 3 lanes



Bedding Disposal System



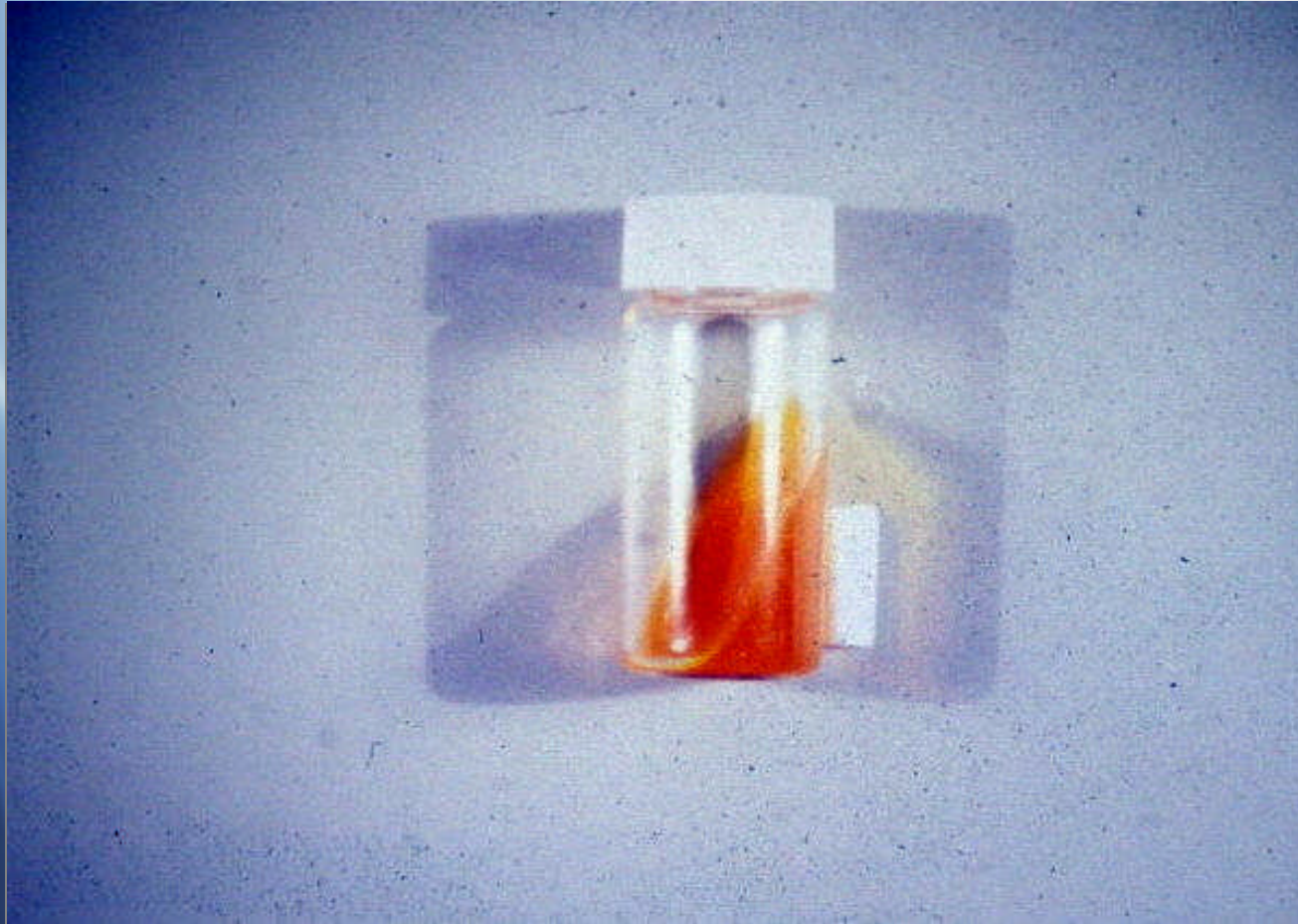
Bedding Dump Station



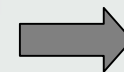
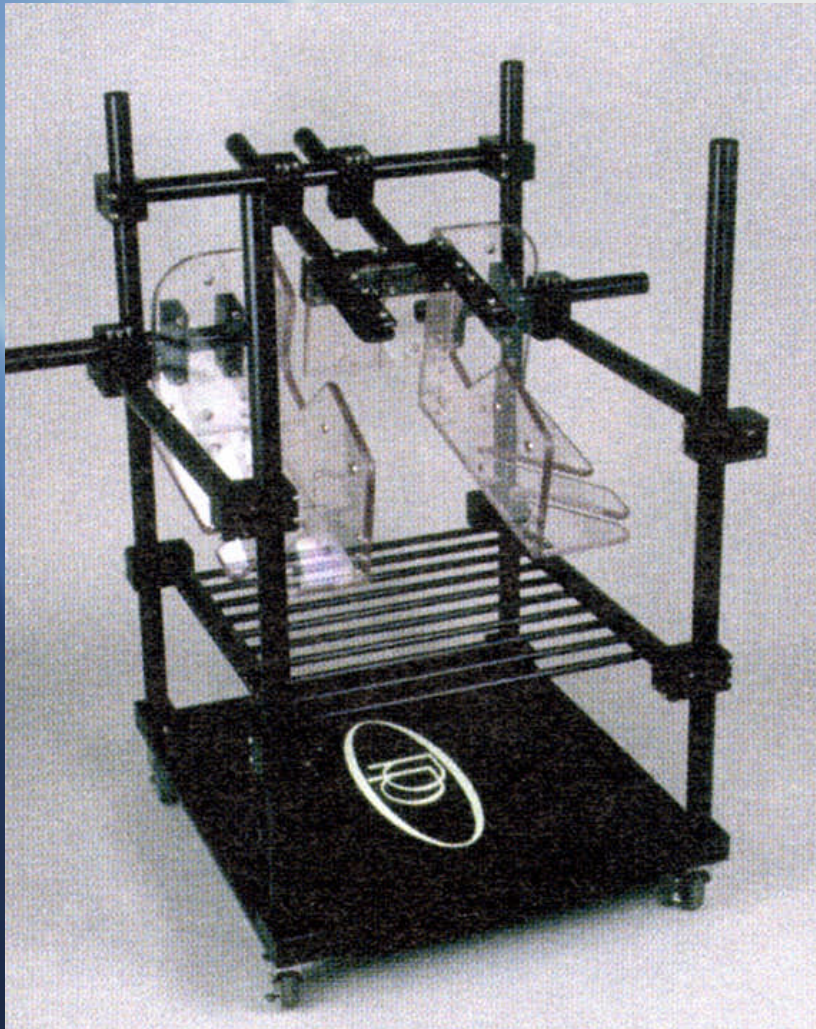
Corn crib (NHP housing)



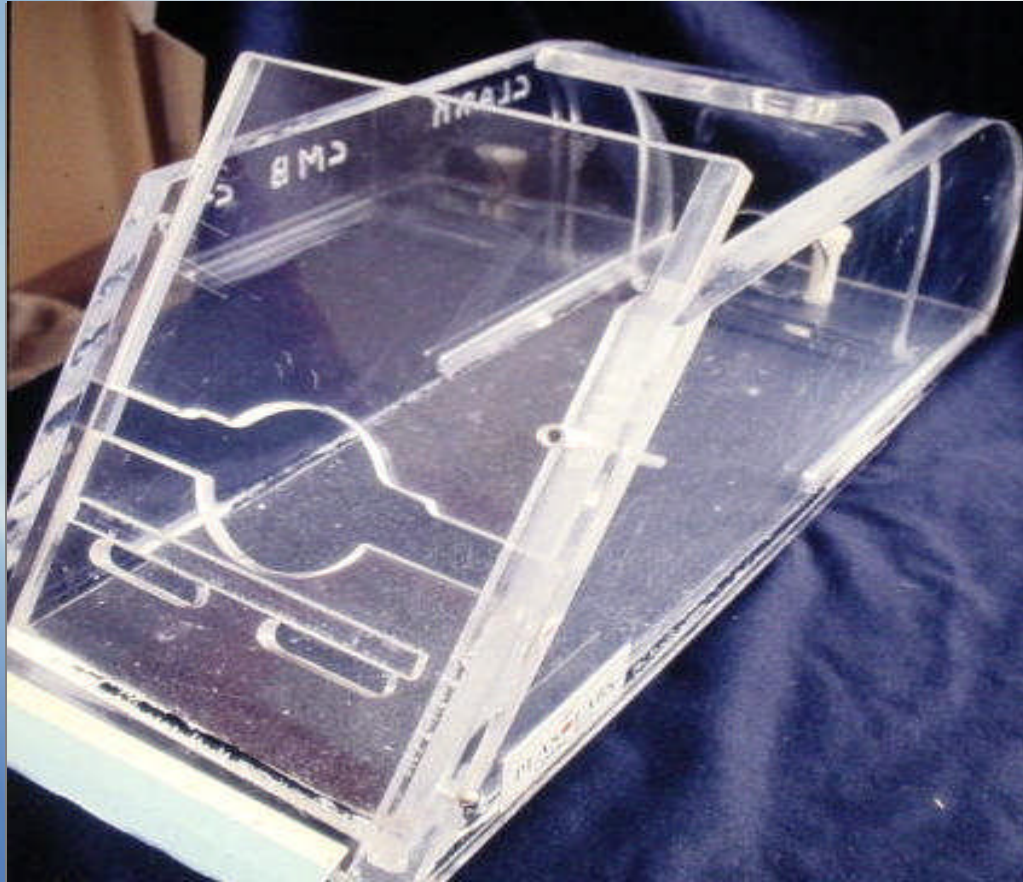
DTM - Dermatophyte test media



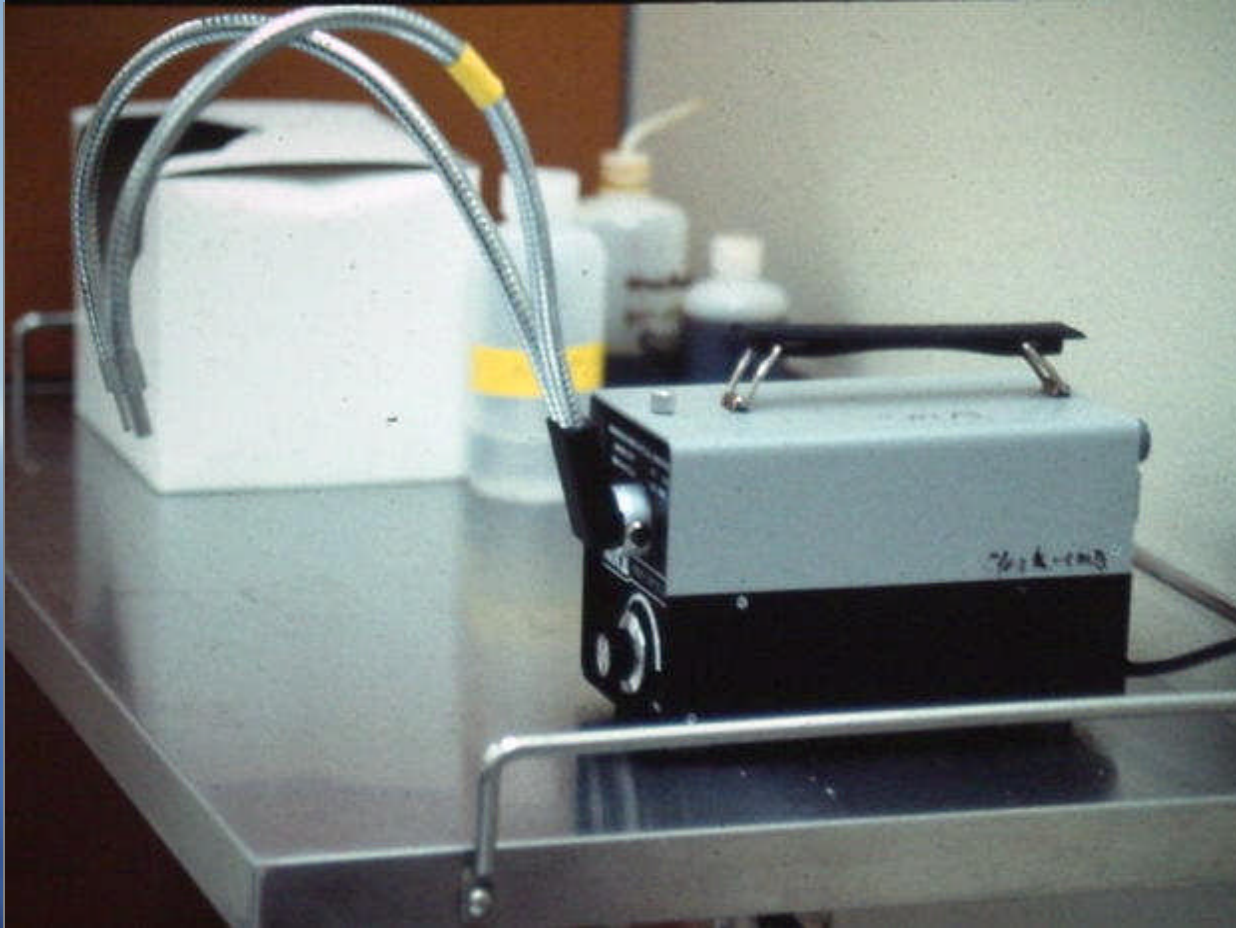
Nonhuman Primate Restraint-Chair and pole & collar equipment



Rabbit restrainer



Fiberoptic light source



The background features a gradient from dark blue on the left to light blue/white on the right. Several diagonal lines, some solid and some dashed, cross the frame from the top-left towards the bottom-right.

Good Luck!