The 3 Ts Serving the 3 Rs:

Creation of **Translational Training Tools™** as a method to provide effective, low stress, and quality hands-on training to individuals working with animals.

April 11th, 2018 - Oslo, Norway

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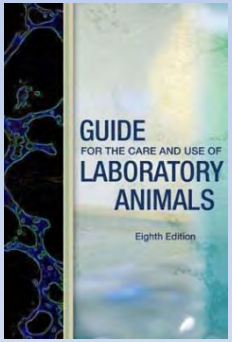
Center for Animal Resources and Education (CARE)
at Cornell University, Ithaca, New York
ras.research.cornell.edu/care/3T

The Guide for the Care and Use of Laboratory Animals p. 4 states:

"The Three Rs have become an internationally accepted approach **for researchers to apply when deciding to use animals in research** and in designing humane animal research studies".



It is equally important to apply the Three Rs concept to the humane use of animals **during hands-on training**.
We set a goal to restructure our approach to hands-on training, to better incorporate the Three Rs.

Setting a standard for developing a 3 Rs-based training method by creating a mission statement

Cornell University Center for Animal Resources and Education (CARE) Training Team Mission:

Be role models for the responsible use of animals.

Emphasize the importance of minimizing pain and distress in the animals used for teaching and research; make animal comfort a priority during training classes.

Accommodate the needs of our trainees and guide them towards competency on the procedures required to accomplish their research goals.

Promote practical application of the 3 Rs (*Replace, Reduce and Refine*) through the use of inanimate models for hands-on training.

https://ras.research.cornell.edu/care/3T.html

Identifying fundamental concepts to address during our 3 Rs-based training method.

- **Concept # 1**: Addressing Training Leaps (TLs)
- **Concept # 2**: Mastering Key Learning Issues (KLIs)
- **Concept # 3**: Creating and using the right tools to tackle the TLs and master the KLIs

Concept # 1: Addressing Training Leaps (TLs)

- TLs occur when the path to learning a technique requires the trainee leap from a concept to hands-on practice; rather than taking smaller steps to achieve the final training goals.

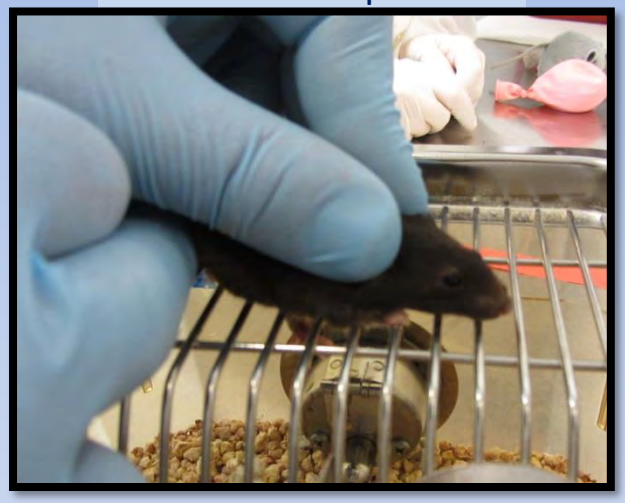
Addressing Training Leaps (TLs)

A. Theory/description of procedure

How do we get from A to B?

TL

B. Live animal practice



- Live animal practice occurs early in the learning process; such that essential steps to understanding the procedure might be missed.
- Limits the opportunity to address misinterpretations of instructions; correct errors; and refine techniques prior to attempting live animal practice.
- There is a risk of increased distress and potential discomfort to our training animals; and may also lead to distress for both trainee and trainer.

Concept #2: Mastering Key Learning Issues (KLIs)

The most challenging concepts and steps for our trainees to grasp, and for our trainers to convey for each procedure that we teach.

- Live animal anatomy often conceals structures that are essential to conceptualizing several steps of a procedure; resulting in a **KLI** that needs to be addressed.
- As a frame of reference for the importance of correct technique, demonstration of improper technique can help trainees to better appreciate several **KLIs**.
  - Demonstrating poor technique on live animals is not appropriate; therefore, alternative methods must be sought to address these **KLIs**.

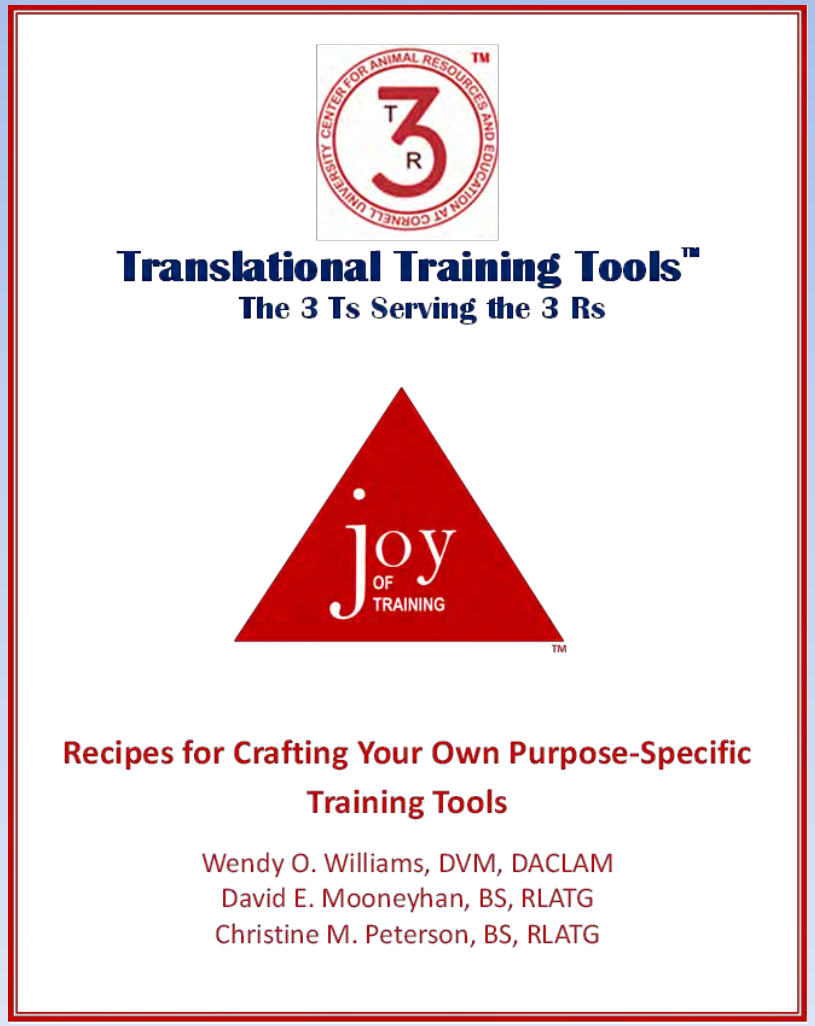
Mouse Restraint KLIs

1. Picking the mouse up and out of the cage
2. Maneuvering the mouse by the tail to position the animal on the cage top, in preparation for restraint
3. Using the bars of the cage top to help position the mouse for restraint
4. Placing some hand pressure on the mouse's back, to immobilize the animal in preparation for gathering the scruff between the fingers
5. Grasping only the skin in the scruff; determining how much skin one must handle to properly scruff the mouse
6. Securing the scruff before lifting the mouse
   a) Avoid scruff and lift at the same time
   b) Teach using a 2-step process
7. Positioning the tail between the fingers and the palm of the hand

Concept #3: Creating and using the right tools to address TLs and master the KLIs

- We developed a 3 Rs-based training method that implements a variety of inanimate tools, designed specifically to target the **KLIs** identified for learning and practicing a procedure.
- Use affordable and effective means to implement the 3 Rs alternatives into hands-on training programs.

Translational Training Tools™
The 3 Ts Serving the 3 Rs™

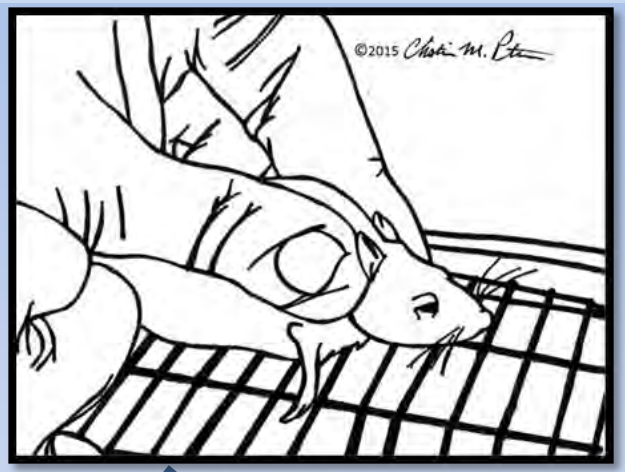


The 3 Ts training manual's are available online at: https://ras.research.cornell.edu/care/3T.html

Translational Training Tools ™

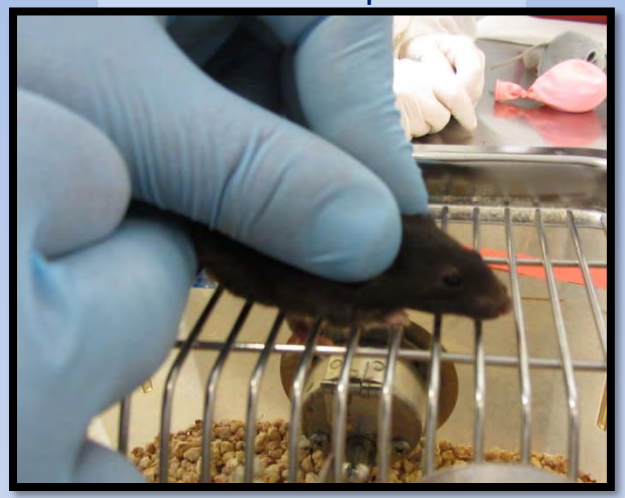
training method to address TLs

A. Theory/description of procedure



How do we get from A to B?

B. Live animal practice



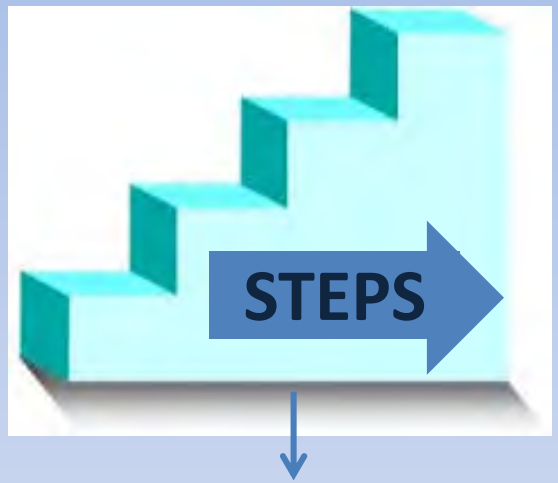
Use a Translational Training Tool ™ to :

- Visualize anatomy and conceptualize the steps of the procedure.
- Build the muscle memory that will later be **translated** to live animal practice.
- Facilitate learning using **options** for **multiple steps** to master **KLIs.**
- Maximize the opportunity to master the **KLIs**; in preparation for experiencing the complexities of practicing on a live animal; and separate from any risk of causing injury or undue stress to training animals or trainees.

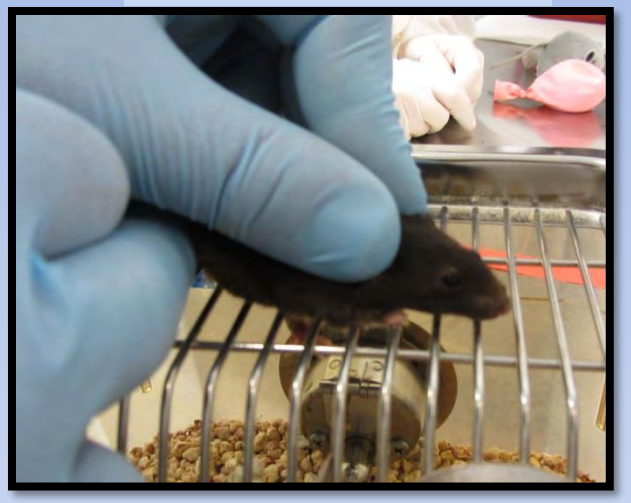
Translational Training Tools ™

Training Method and Concept

A. Theory/description of procedure



B. Live animal practice



1. Describe procedure using analogies, images and diagrams to explain relevant anatomy, concepts and **KLIs**

2. Demonstrate with **3 Ts** tool and emphasize anatomy, hand positions and motions to facilitate mastering the **KLIs**

3. Conduct supervised practice with a **3Ts** tool to correct errors, address mis-interpretations and refine skills

4. Confirm competency and mastery of **KLIs** on a **3 Ts** tool before advancing practice to a more advanced tool or live animal

5. Practice on a live animal and confirm competency on all **KLIs** to complete the training on the procedure

Mouse Restraint KLIs

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3. Using the bars of the cage top to help position the mouse for restraint
4. **Placing hand pressure on the mouse's back, to immobilize the animal in preparation for gathering the scruff between the fingers**
5. **Grasping only the skin in the scruff; determining how much skin one must handle to properly scruff the mouse**
6. Securing the scruff before lifting the mouse
   a) Avoid scruff and lift at the same time
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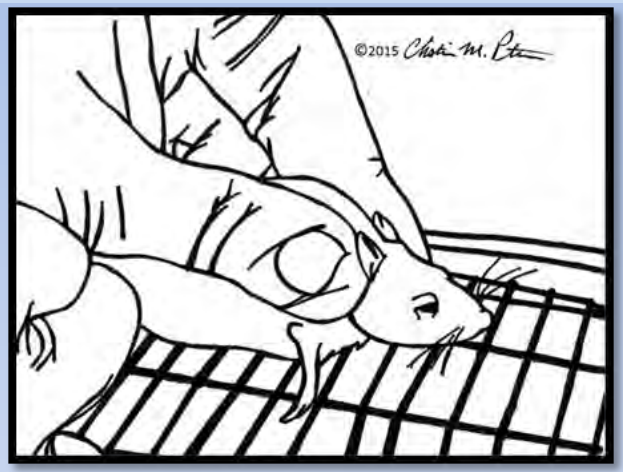
7. Positioning the tail between the fingers and the palm of the hand.

Translational Training Tools ™

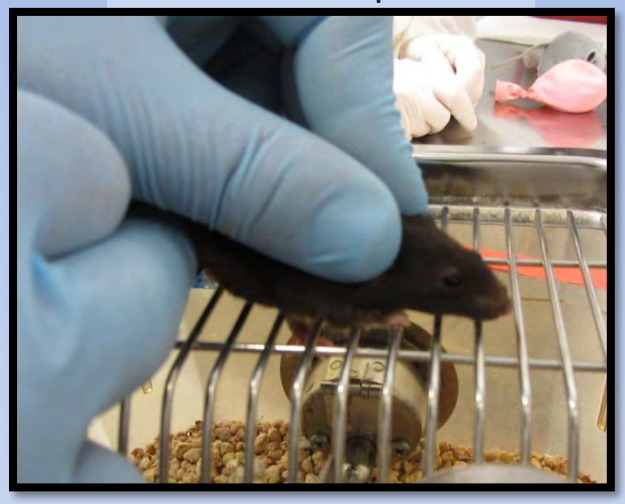
Scruffing a mouse

A. Theory/description of procedure



How do we get from A to B?

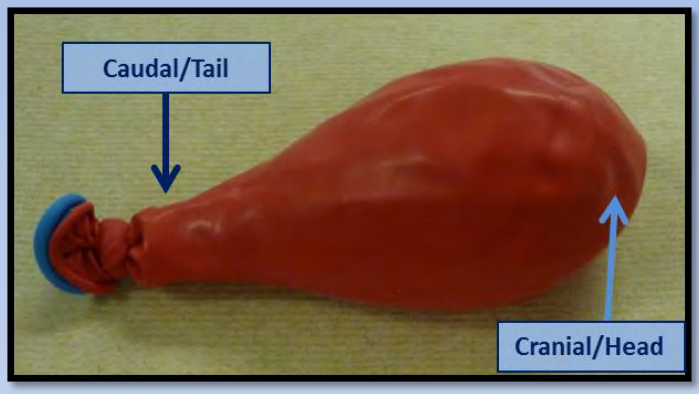
B. Live animal practice

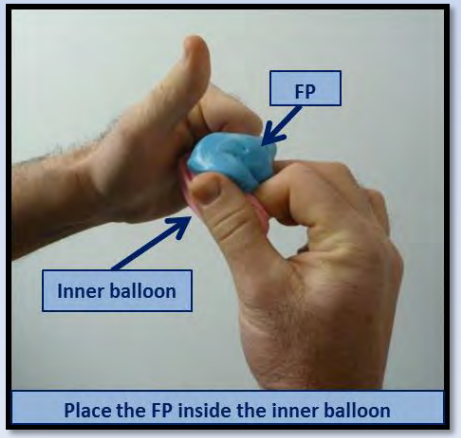


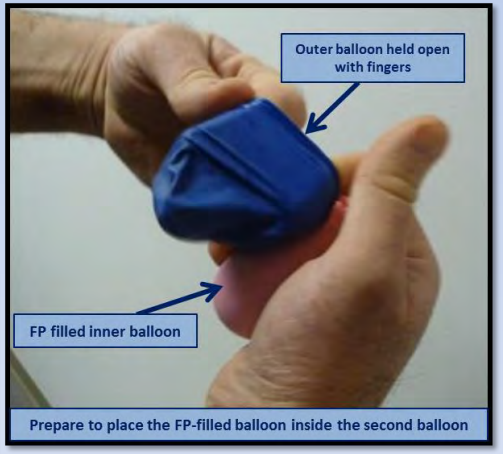
Translational Training Tool ™

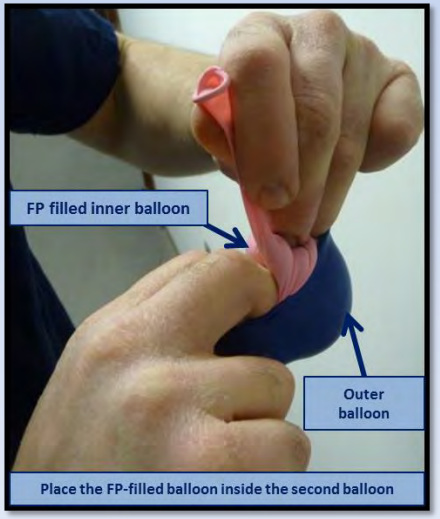
Translational Training Tools™

FP Balloon ™ Mouse









Use **FP Balloon™** to teach the steps and address KLIs related to proper mouse restraint :

1. **Picking the mouse up and out of the cage**
2. **Maneuvering the mouse by the tail to position the animal on the cage top, in preparation for restraint**
3. Using the bars of the cage top to help position the mouse for restraint
4. **Placing hand pressure on the mouse's back, to immobilize the animal in preparation for gathering the scruff between the fingers**
5. **Grasping only the skin in the scruff; determining how much skin one must handle to properly scruff the mouse**
6. **Securing the scruff before lifting the mouse**
   a) **Avoid scruff and lift at the same time**
   b) **Teach using a 2-step process**
7. **Positioning the tail between the fingers and the palm of the hand.**

Restraining an **FP Balloon™** Mouse

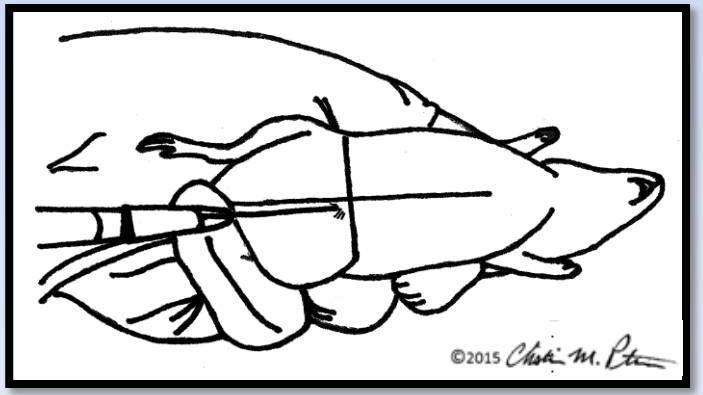
- Additional uses
  - Injection practice
  - Surgery practice

Injection training and practice with an **FP Balloon™** Mouse

Intraperitoneal Injections

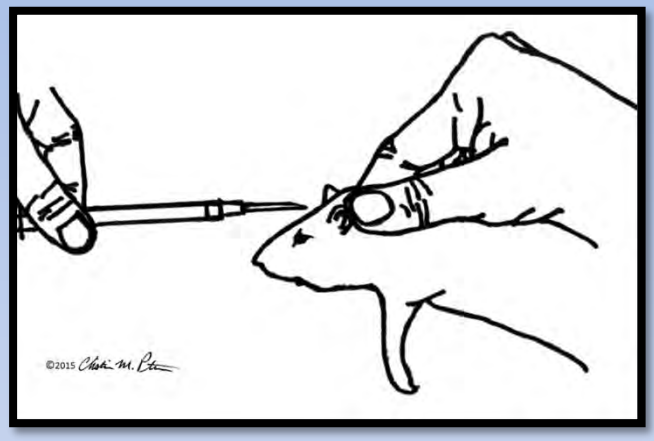
Skills are translated to live animal practice

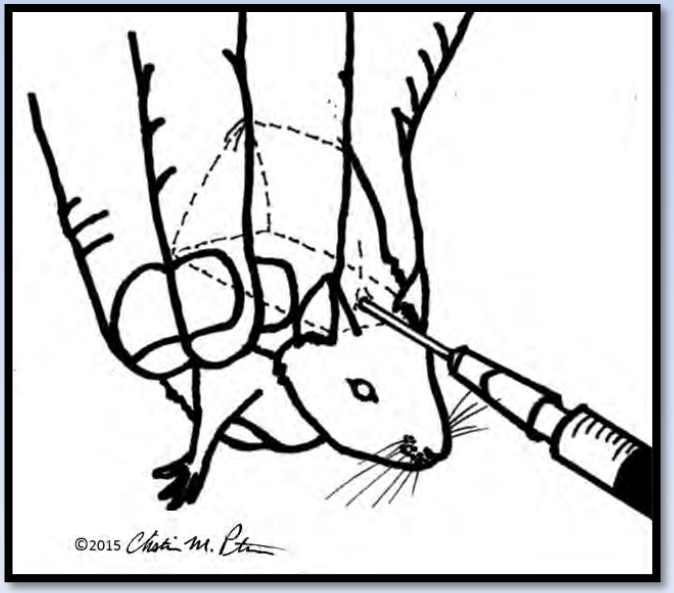
The skills are developed using the **FP Balloon™**

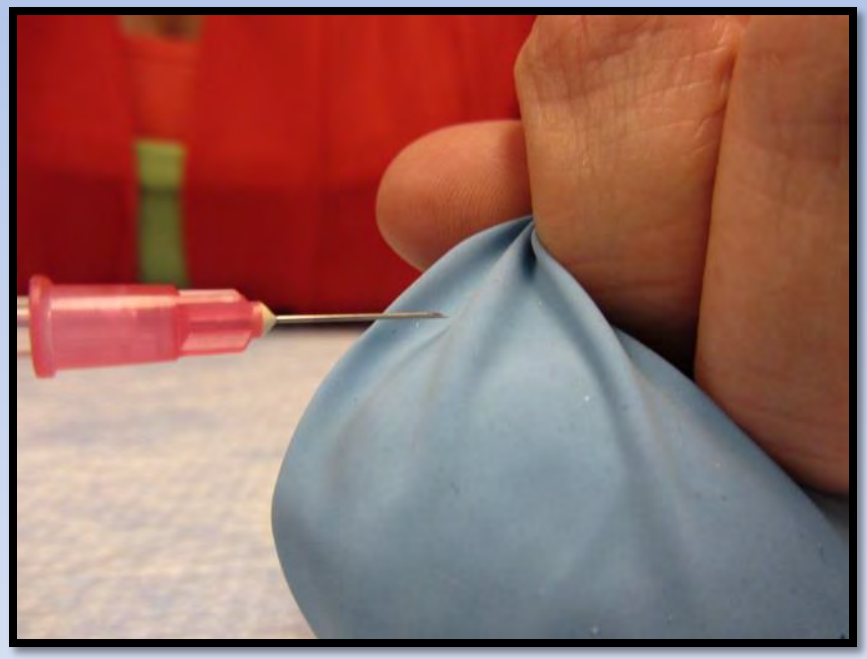


We make use of visual material and analogies to help trainees understand the landmarks and general approach for injecting a substance into a rodent's peritoneal cavity

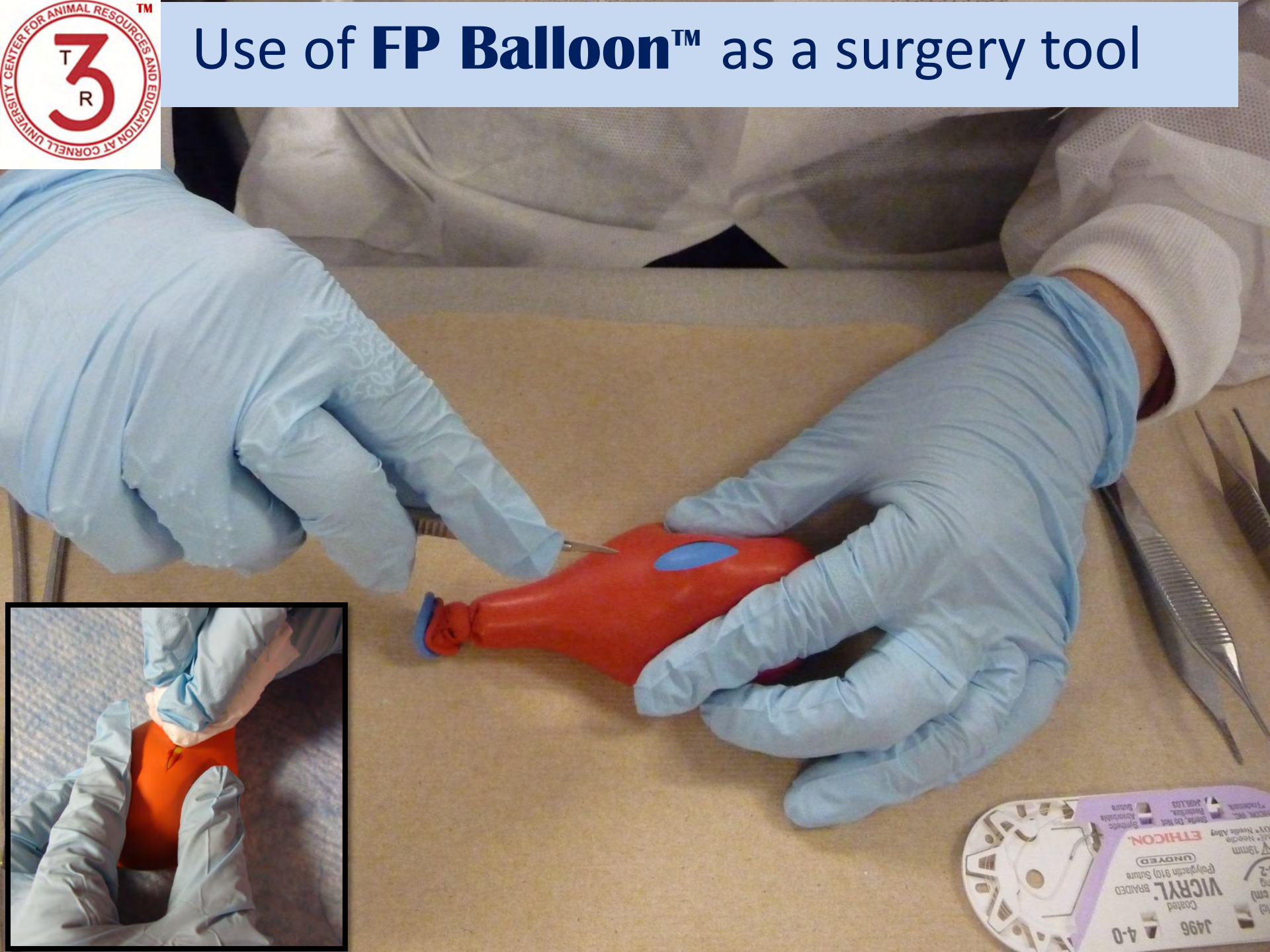
Injection training and practice with an **FP Balloon™** Mouse



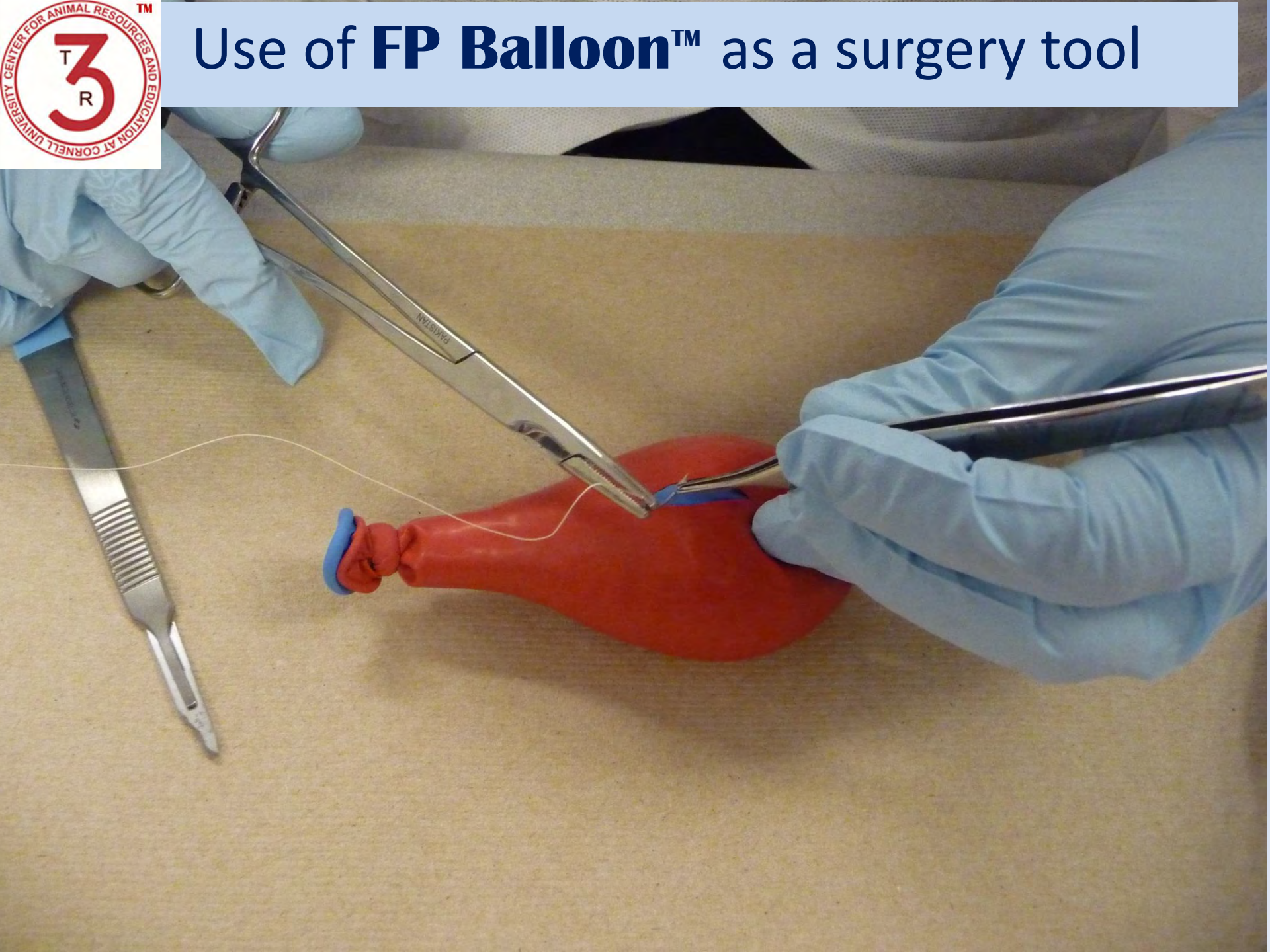




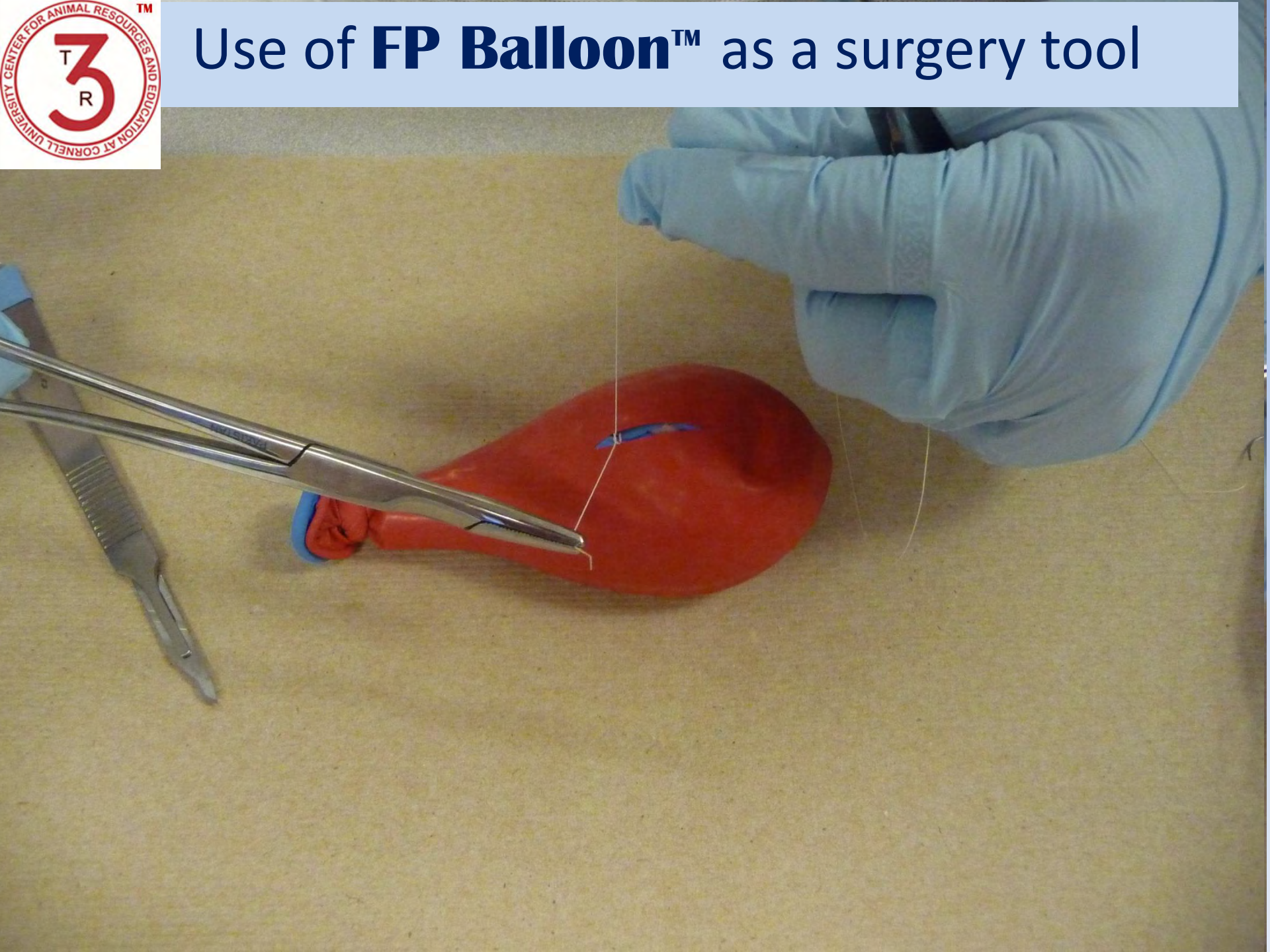
Use of **FP Balloon™** as a surgery tool

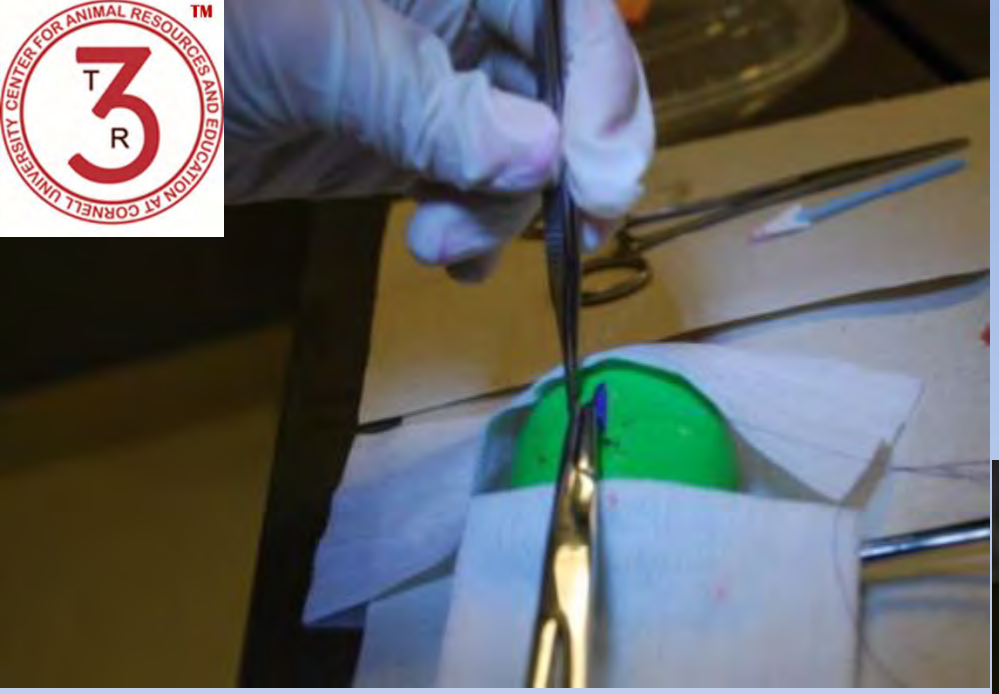


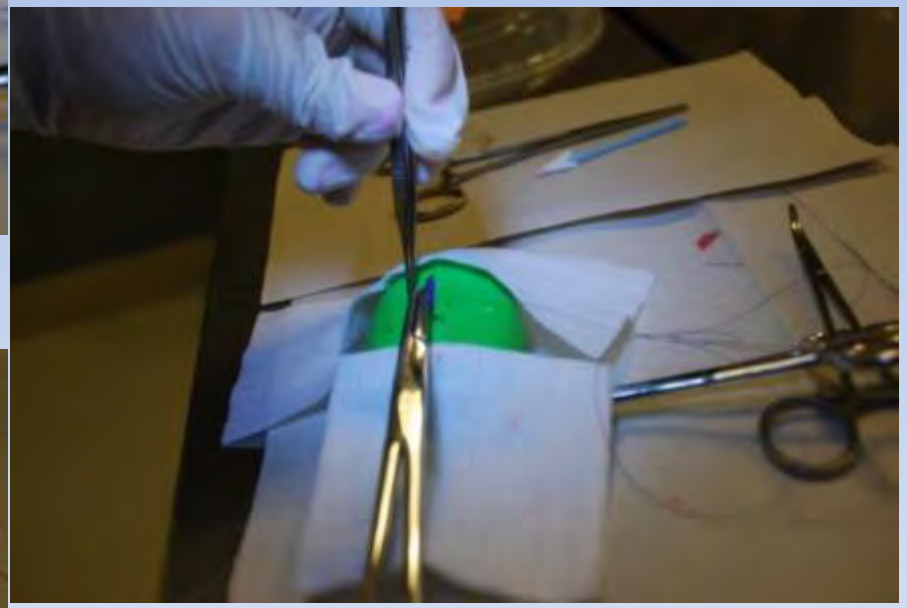
Use of **FP Balloon™** as a surgery tool



Use of **FP Balloon™** as a surgery tool

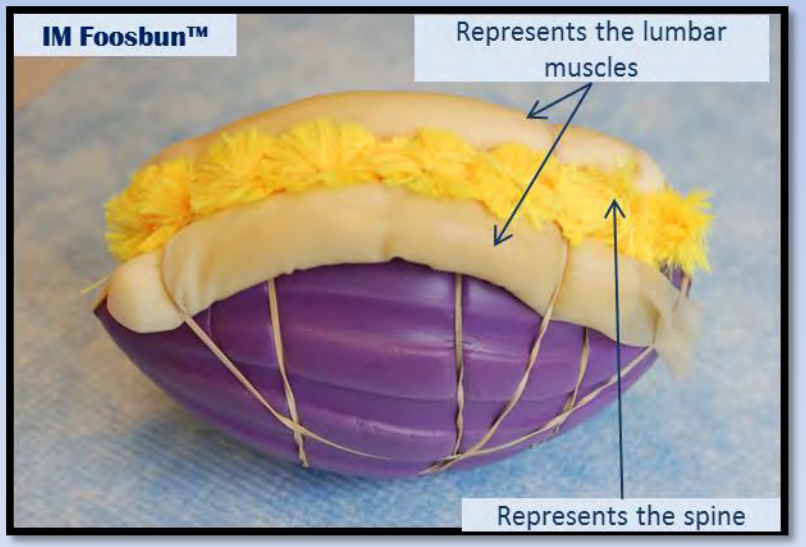






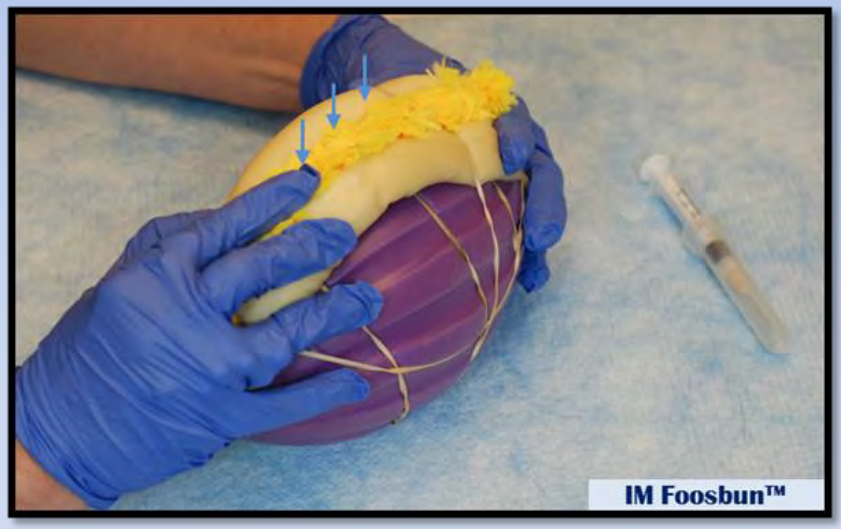
Using a **Translational Training Tools™** to teach and practice Intramuscular (IM) injections in the lumbar muscles of rabbits

Rabbit skeleton; arrows point to the spinous processes of the lumbar spine. The lumbar muscles lay on either side of the spine are particularly large in the rabbit. The curved red line shows roughly where the lumbar muscles are positioned.



IM Foosbun™

Practice with the most basic version of the **IM Foosbun™**



Practice with the intermediate version of the **IM Foosbun™**

Practice with the advanced version of the **IM Foosbun™**

Once KLIs are mastered, practice with a live animal will occur.

Translational Training Tools ™

For blood collection, IV injections and IV catheter placement

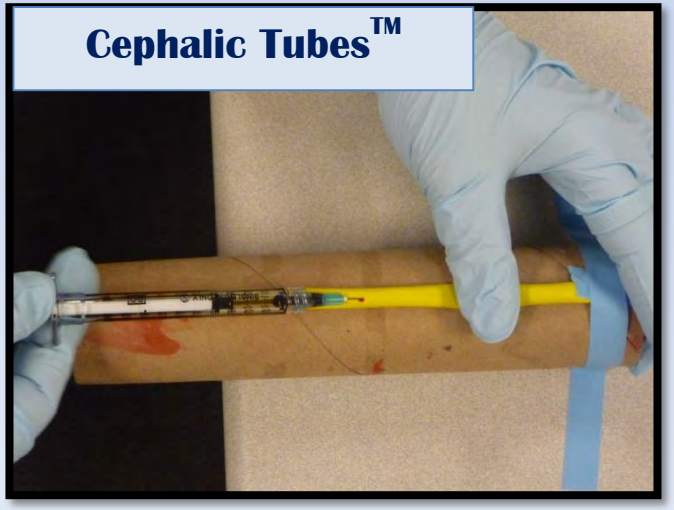
Tube Tails™

Spongey Bun Ears™

Ear Piggy Piggy™

Externally placed blood vessels allows the trainee to clearly see the needle position relative to the blood vessel, and aids in understanding errors in needle positioning, depth and angle.

Cephalic Tubes™



Fake blood

We support the 3 Rs

http://archive.ithacajournal.com/

- Our choice for blood collection tools is "VAMPIRE" blood

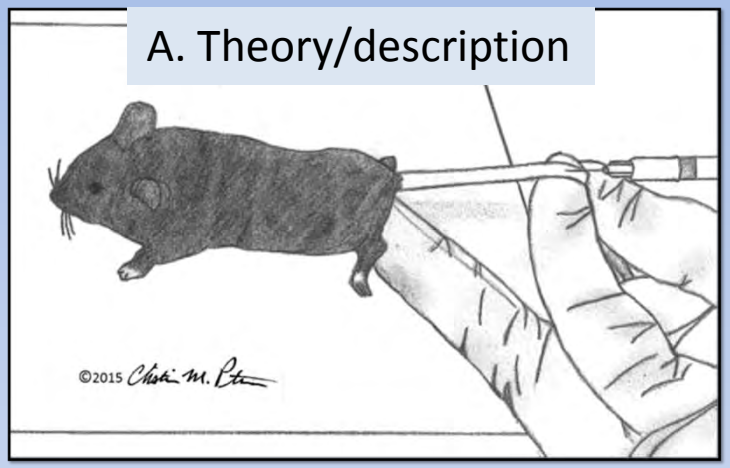
- Other options for fake blood
  - Online recipes
  - Raspberry balsamic vinegar
  - Food coloring (stains)

http://www.fun-world.net/fullsearch/index/?q=vampire+blood

Tube Tails™

Tail vein blood collection (also IV injections and catheter placement)

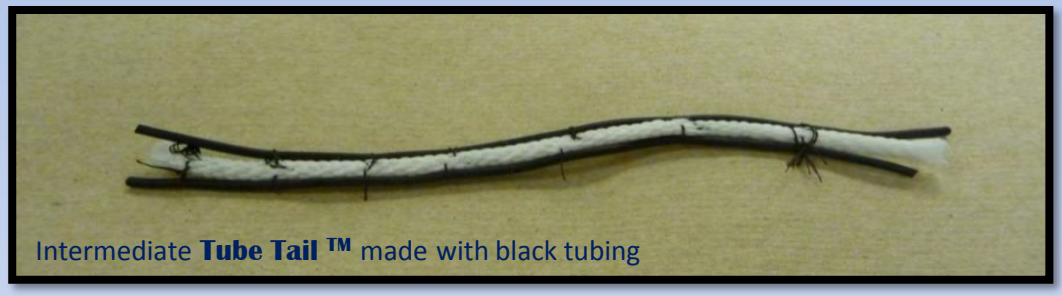
A. Theory/description



B. Live animal

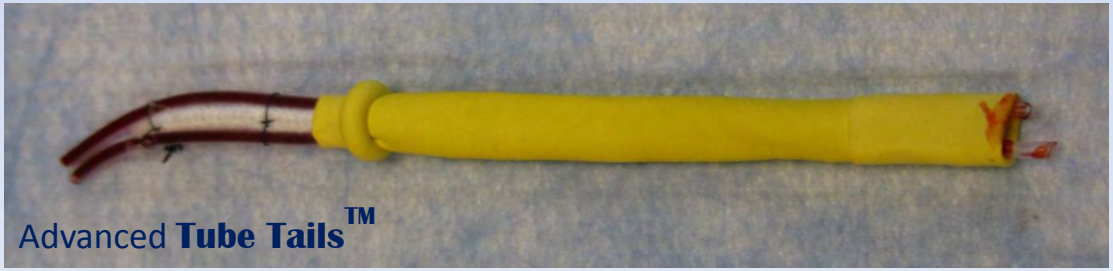
Various finished products
Tube Tails™

Basic **Tube Tail**™



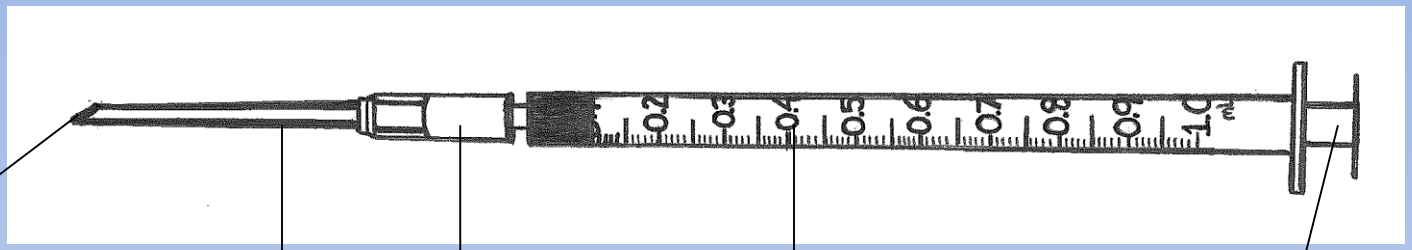
Intermediate **Tube Tail** ™ made with black tubing

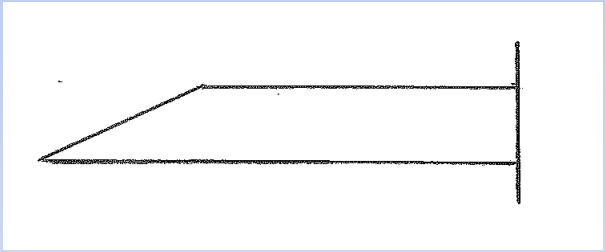
Intermediate **Tube Tail** ™ made with black string and tubing



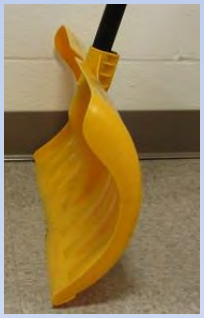
Advanced **Tube Tails**™

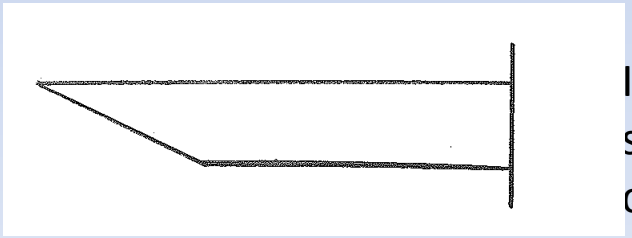
Ensure trainees are familiar syringe handling and safety





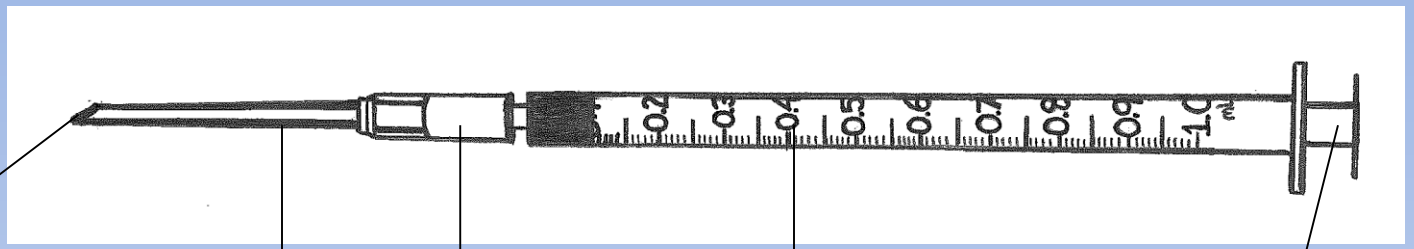
Like the blade of a snow shovel, the bevel of the needle should face “up” for injection

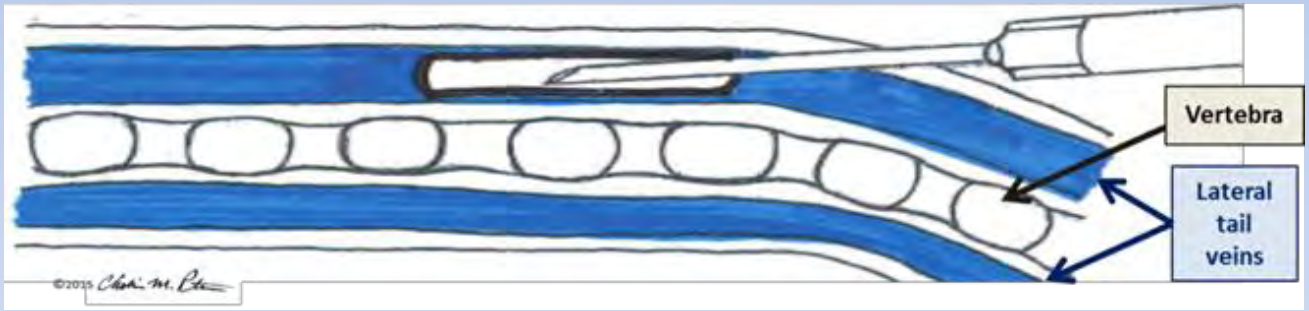


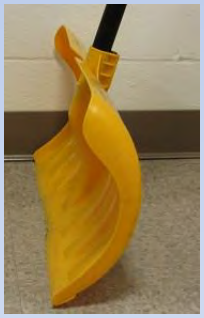


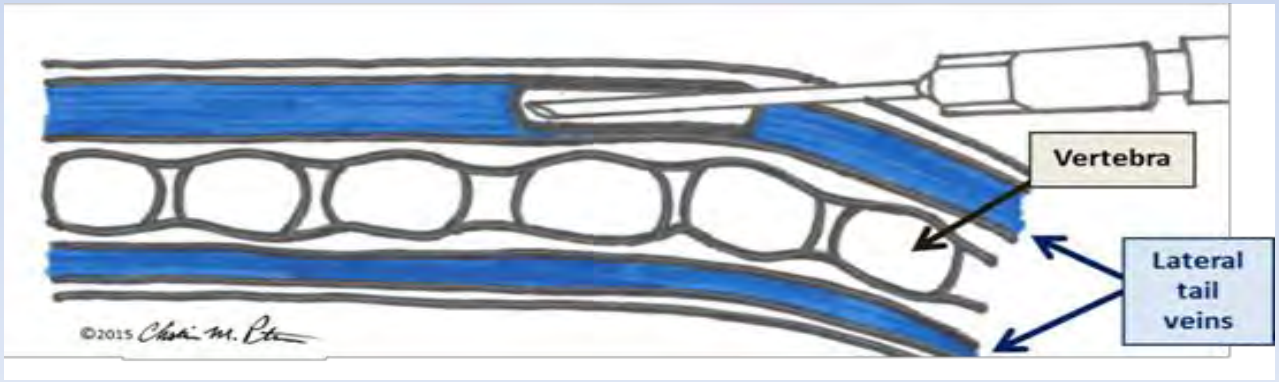
If the bevel faces “down”, it will scrape along the tissue and may cause trauma

Ensure trainees are familiar syringe handling and safety



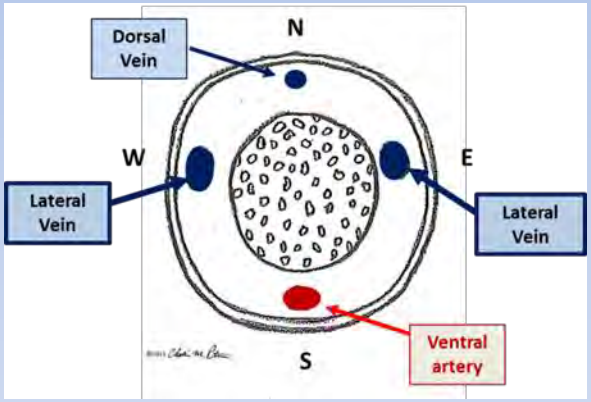


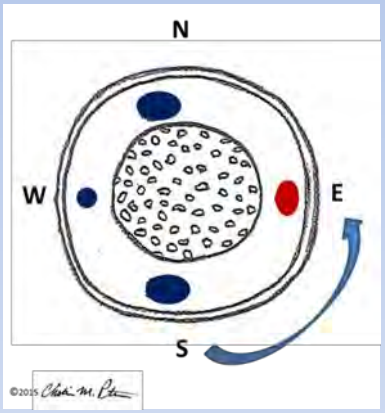




Practicing blood collection using **Tube Tails™**

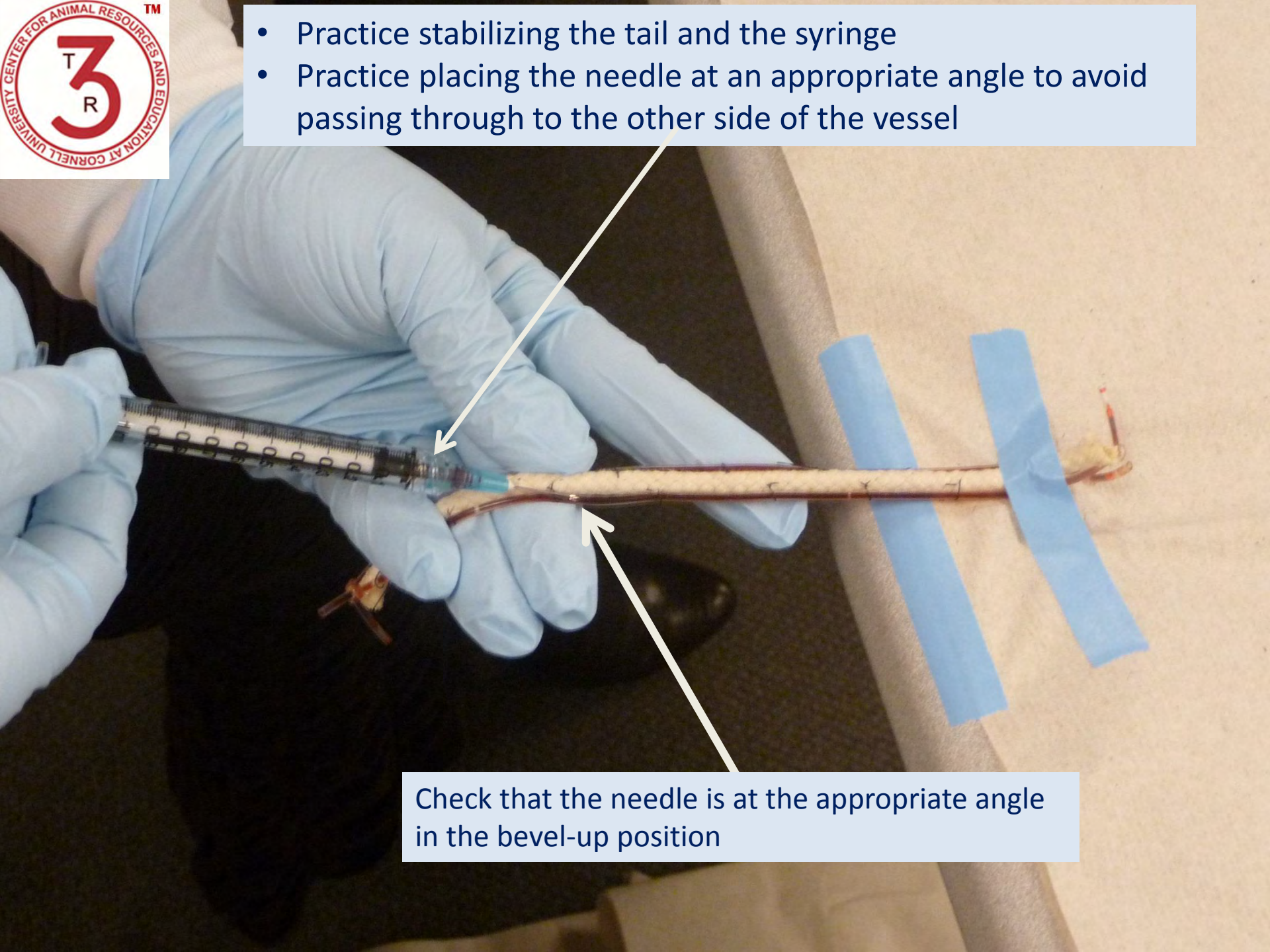
- Demonstrate the anatomy
- Define what we see in reality to what we visualize for training purposes

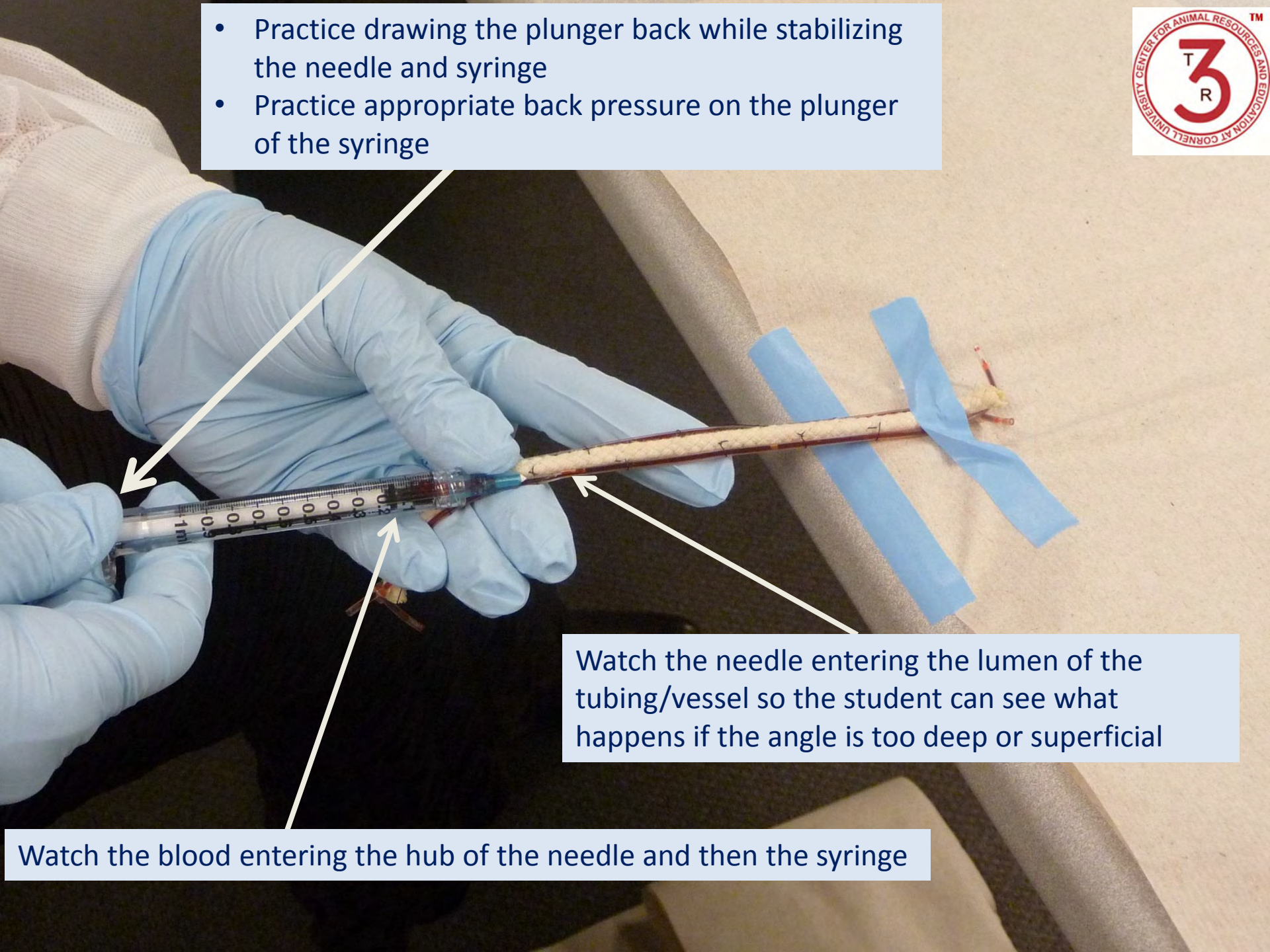




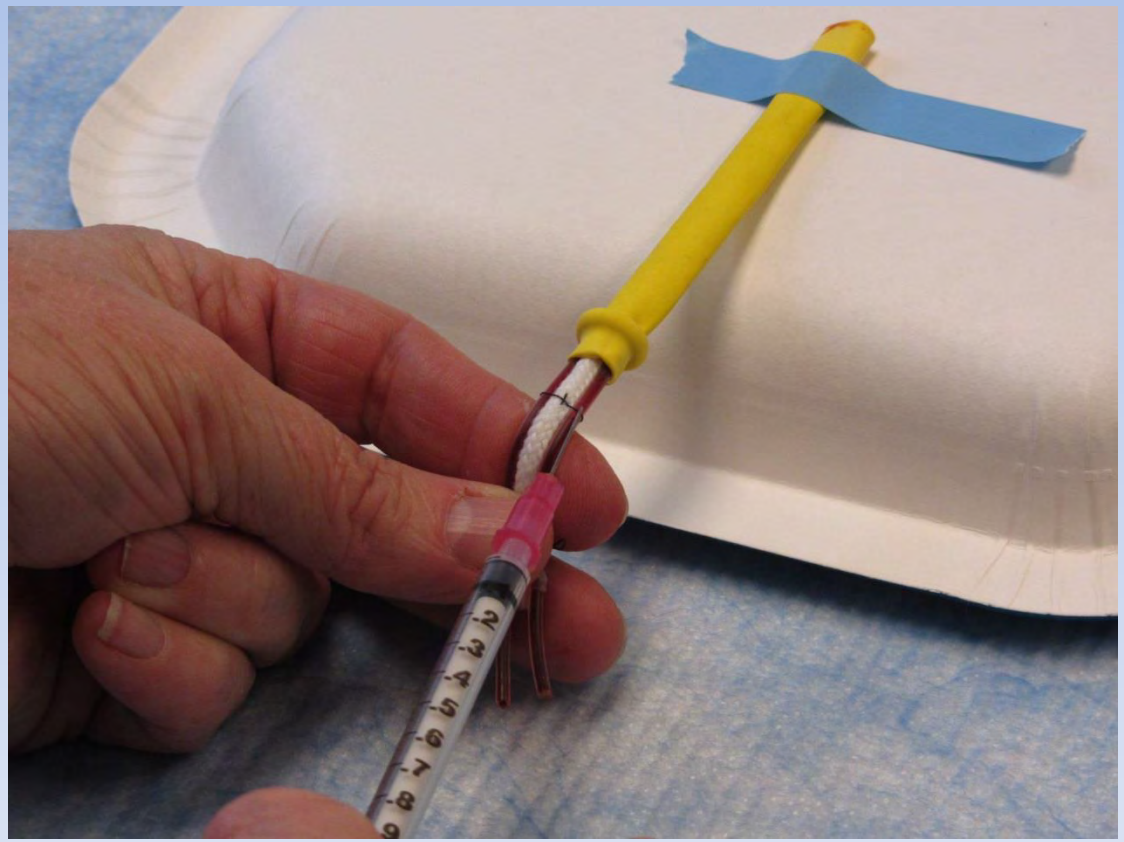
Practicing blood collection using **Tube Tails™**

- It is helpful to have someone hold the tail for you as you practice
- Or you can tape the end of the tail down to the table


• Practice stabilizing the tail and the syringe
• Practice placing the needle at an appropriate angle to avoid passing through to the other side of the vessel
Check that the needle is at the appropriate angle in the bevel-up position


• Practice drawing the plunger back while stabilizing the needle and syringe
• Practice appropriate back pressure on the plunger of the syringe
Watch the needle entering the lumen of the tubing/vessel so the student can see what happens if the angle is too deep or superficial
Watch the blood entering the hub of the needle and then the syringe

Training with more advanced **Tube Tails ™**



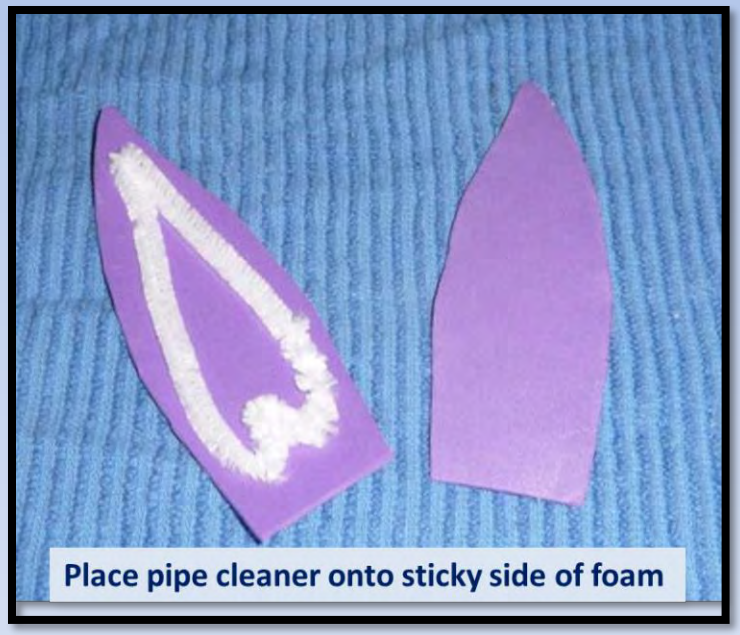
Spongey Bunears™

Marginal ear vein blood collection

A. Theory/description
Diagram of marginal ear vein blood collection

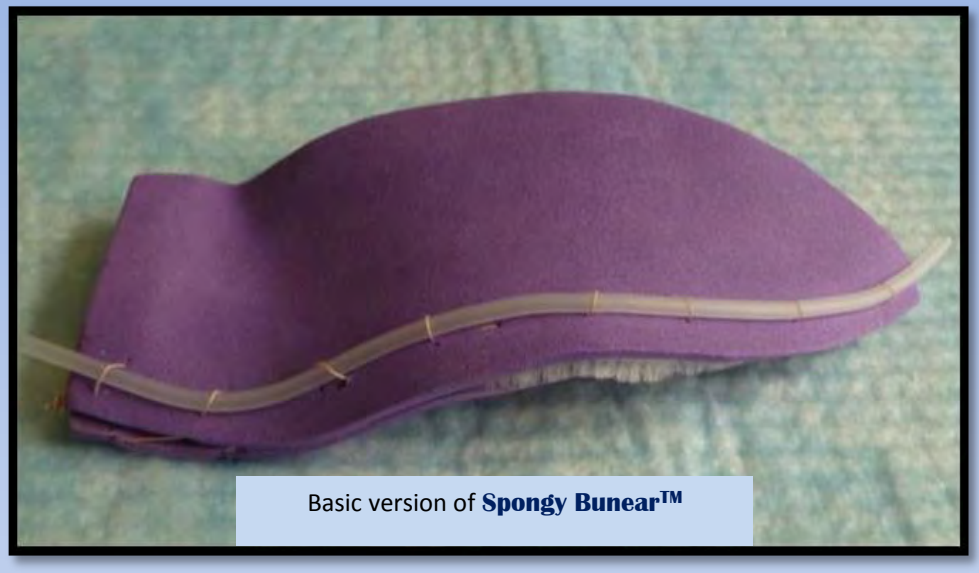
Translational Training Tool ™

Making
Spongey Bunears™



Sew tubing along one side of the ear to represent the marginal ear vein

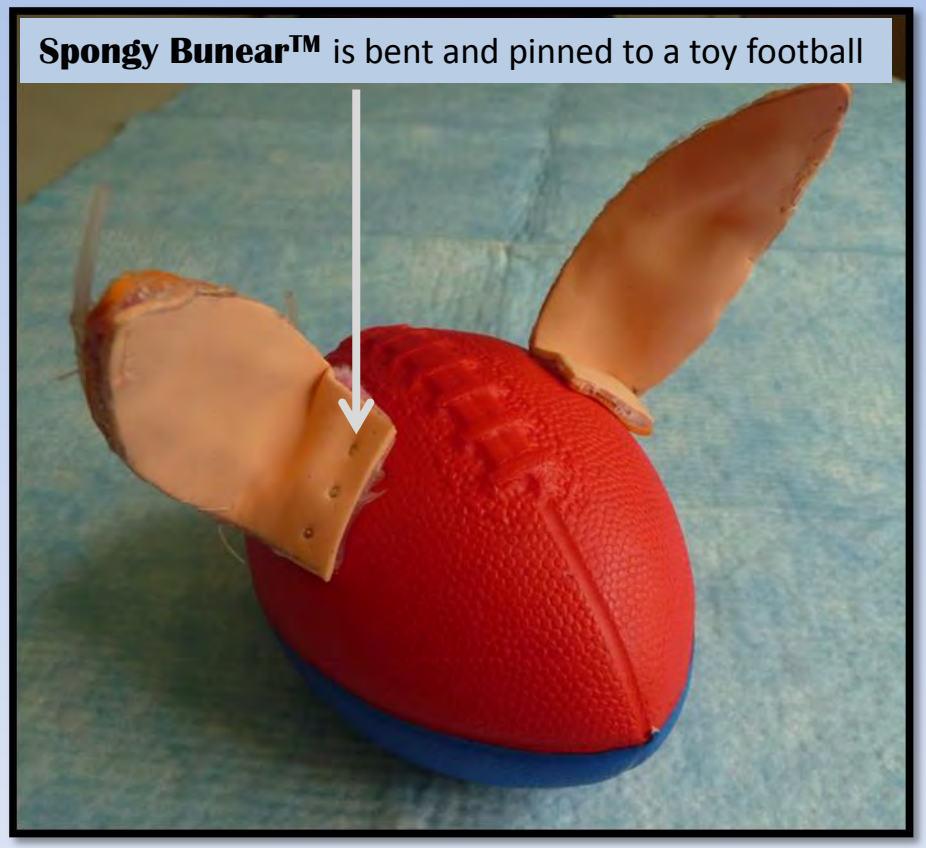
Bend base of ear to tape to the table or pin to a fake rabbit head e.g. toy football



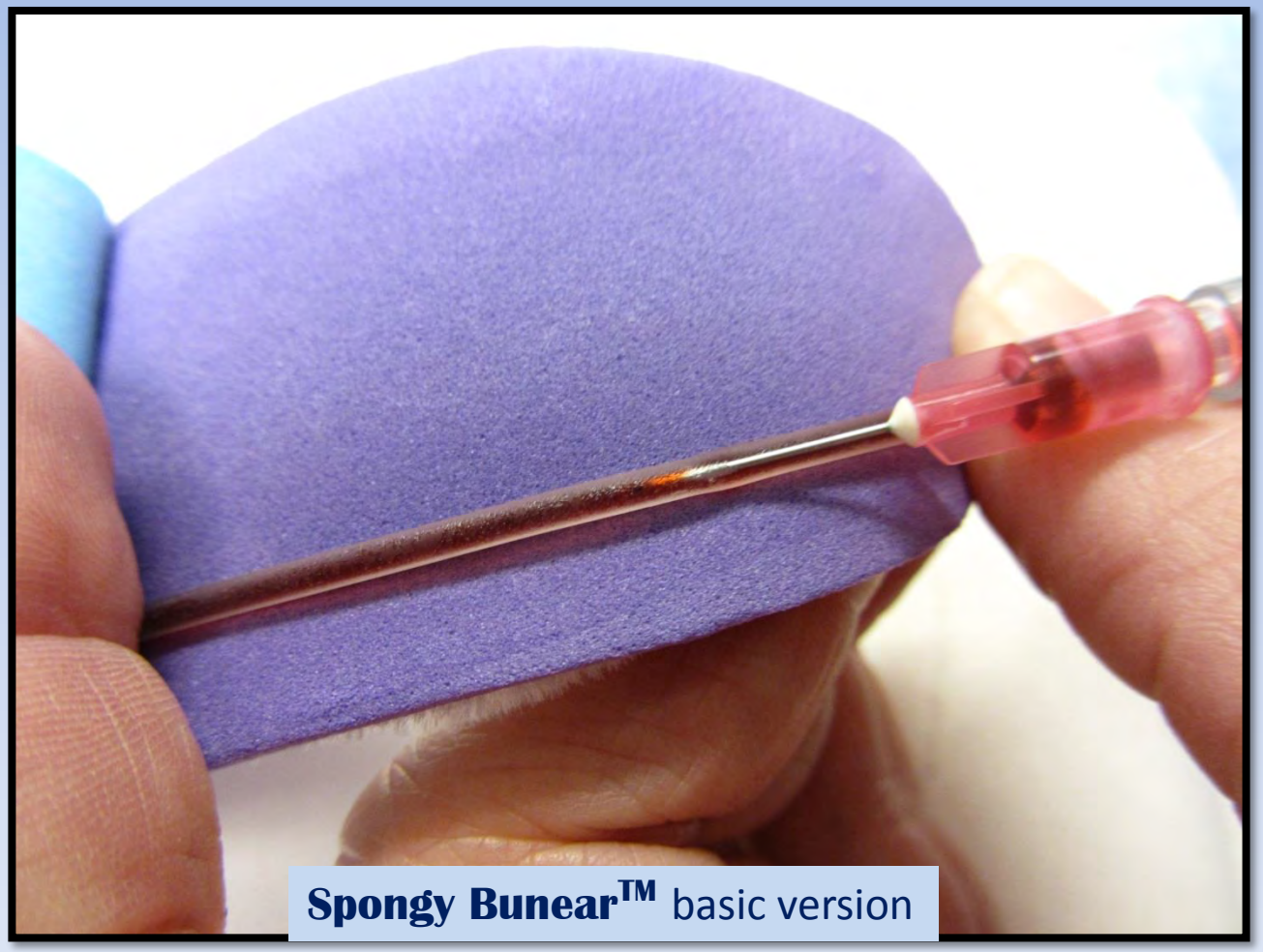
Basic version of **Spongy Bunear™**

Advanced version of **Spongy Bunear™**

Tape it to a table or a toy that simulates the head of the rabbit



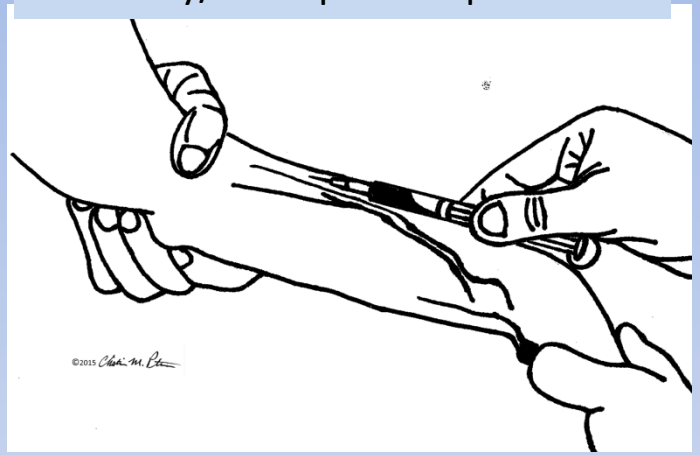
Practicing with the **Spongy Bunears™**



Spongy Bunear™ basic version

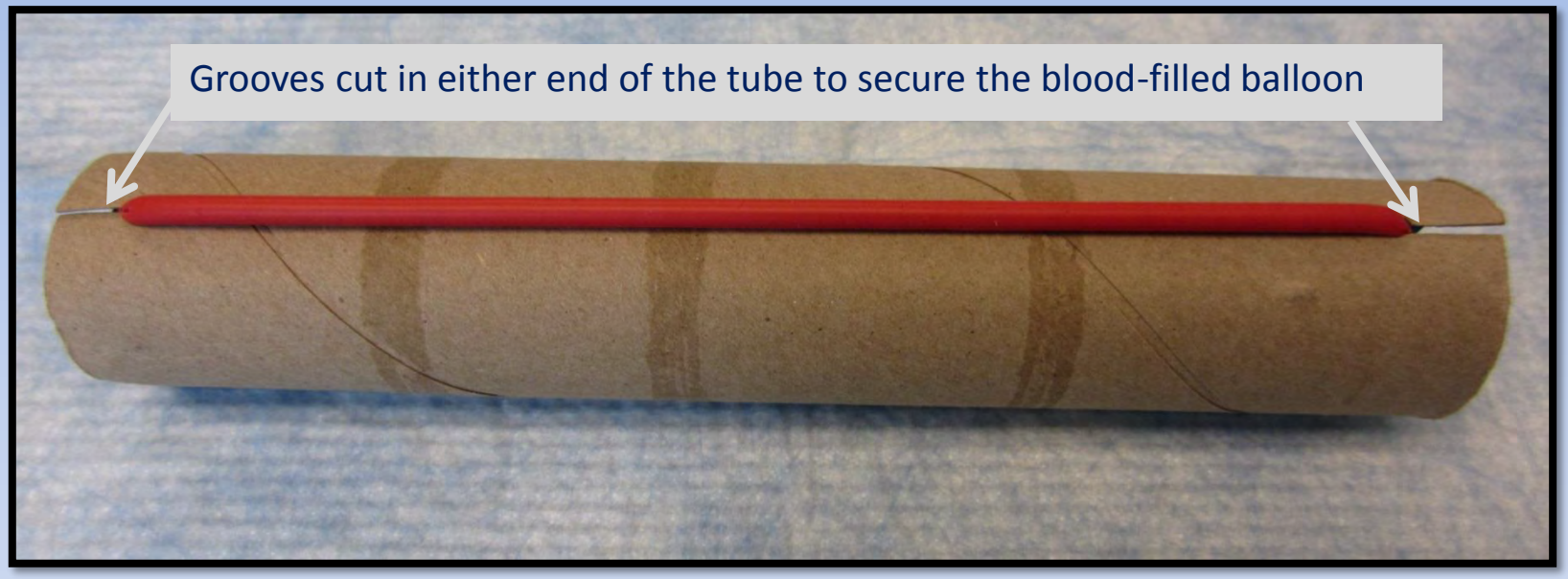
Blood collection: cephalic vein

A. Theory/description of procedure



B. Live animal practice

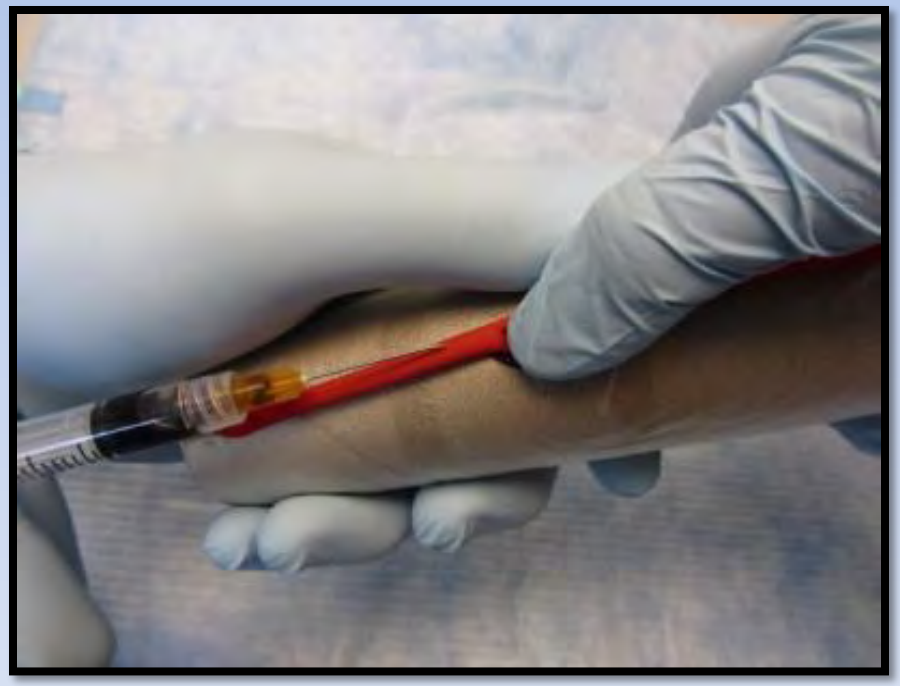
Cephalic Tubes™


Grooves cut in either end of the tube to secure the blood-filled balloon

Optional step to make the tool more advanced:

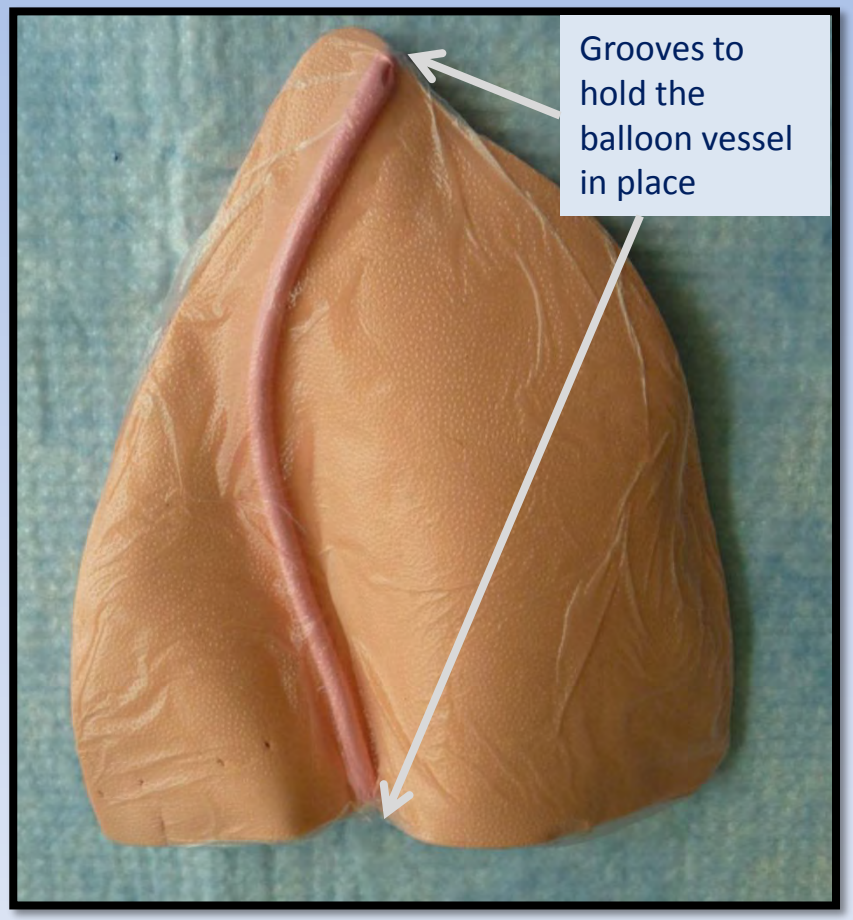
Wrap fabric around the tube and balloon to simulate skin

Initially use the tool uncovered to allow visibility of the vessel and the bevel of the needle; then cover the tool with fabric to mimic dog or cat hair



Catheter placement

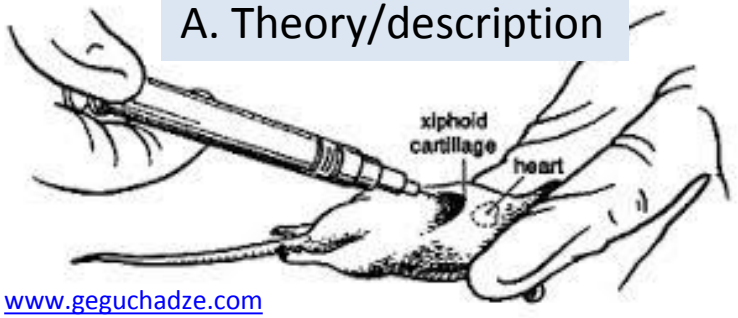
Ear Piggy Piggy™



The ear can be mounted onto an object to simulate the pig's head

Translational tool for cardiac puncture practice

A. Theory/description



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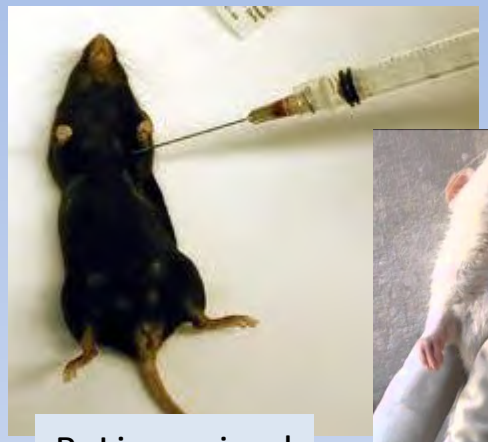
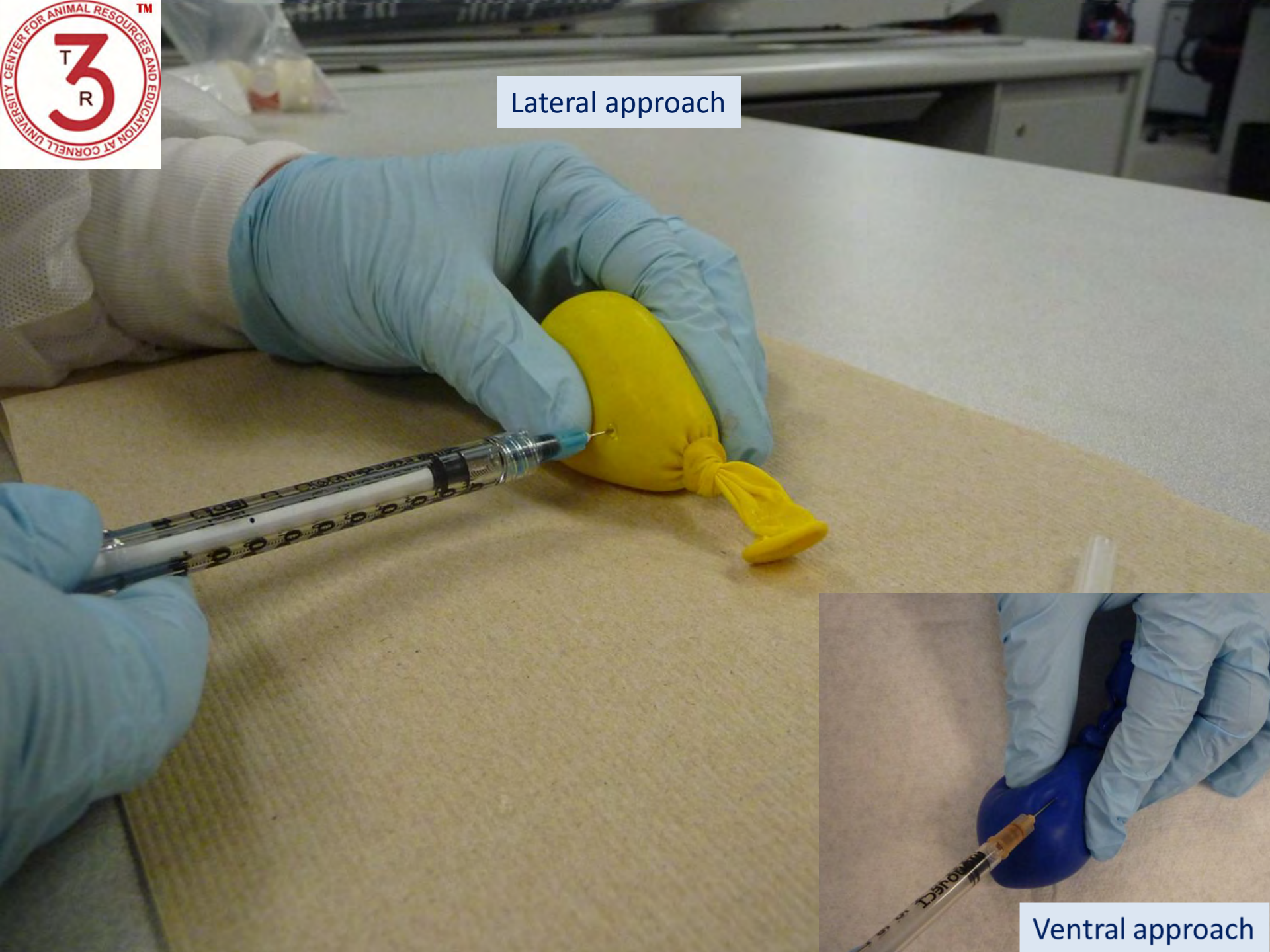


B. Live animal

Cardiac Balloons™

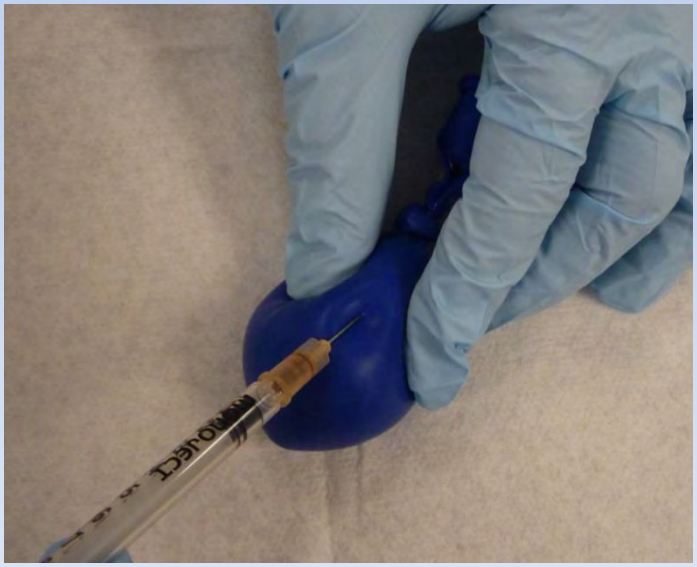
Cardiac Balloons™

- Fill small balloon with fake blood


Lateral approach
Ventral approach

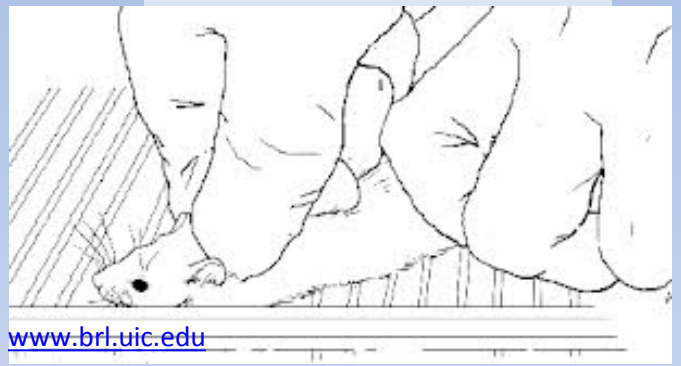
Other uses for Cardiac Balloons™

- Also useful as a cystocentesis practice tool



Translational tool for cervical dislocation practice

A. Theory/description



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B. Live animal

oslovet.norecopa.no

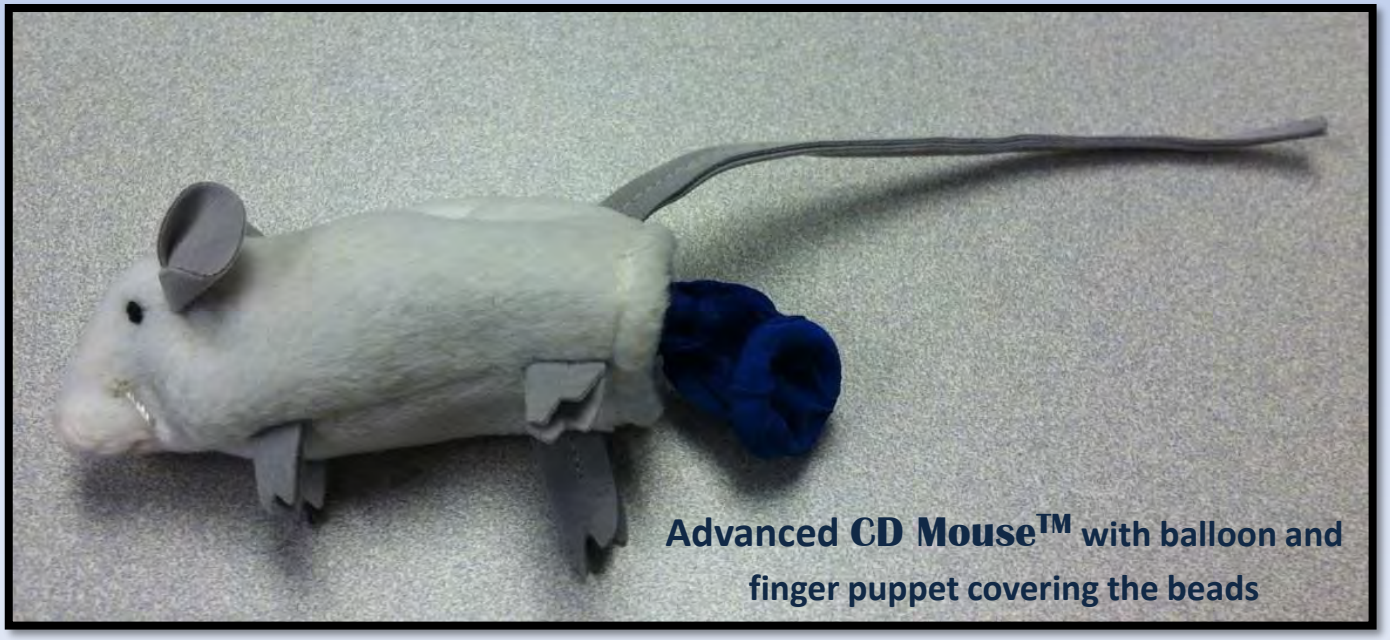
Translational Training Tool: CD Mouse™

CD Mouse™

CD Mouse™ Basic Version

CD Mouse™ Basic - Disarticulated

Intermediate CD Mouse™ balloon-covered the beads



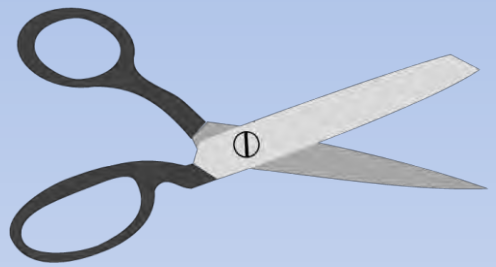
Advanced CD Mouse™ with balloon and finger puppet covering the beads

Practicing Cervical Dislocation using a **CD Mouse™**

- Disarticulate between the first and second bead
- Make sure other beads do not come apart
- Palpate the disarticulation
- Reinforce hand position and pressure
- Helps individual to process the feeling of disarticulating the joint
- Use to teach what do and what not to do

Translational tool for decapitation

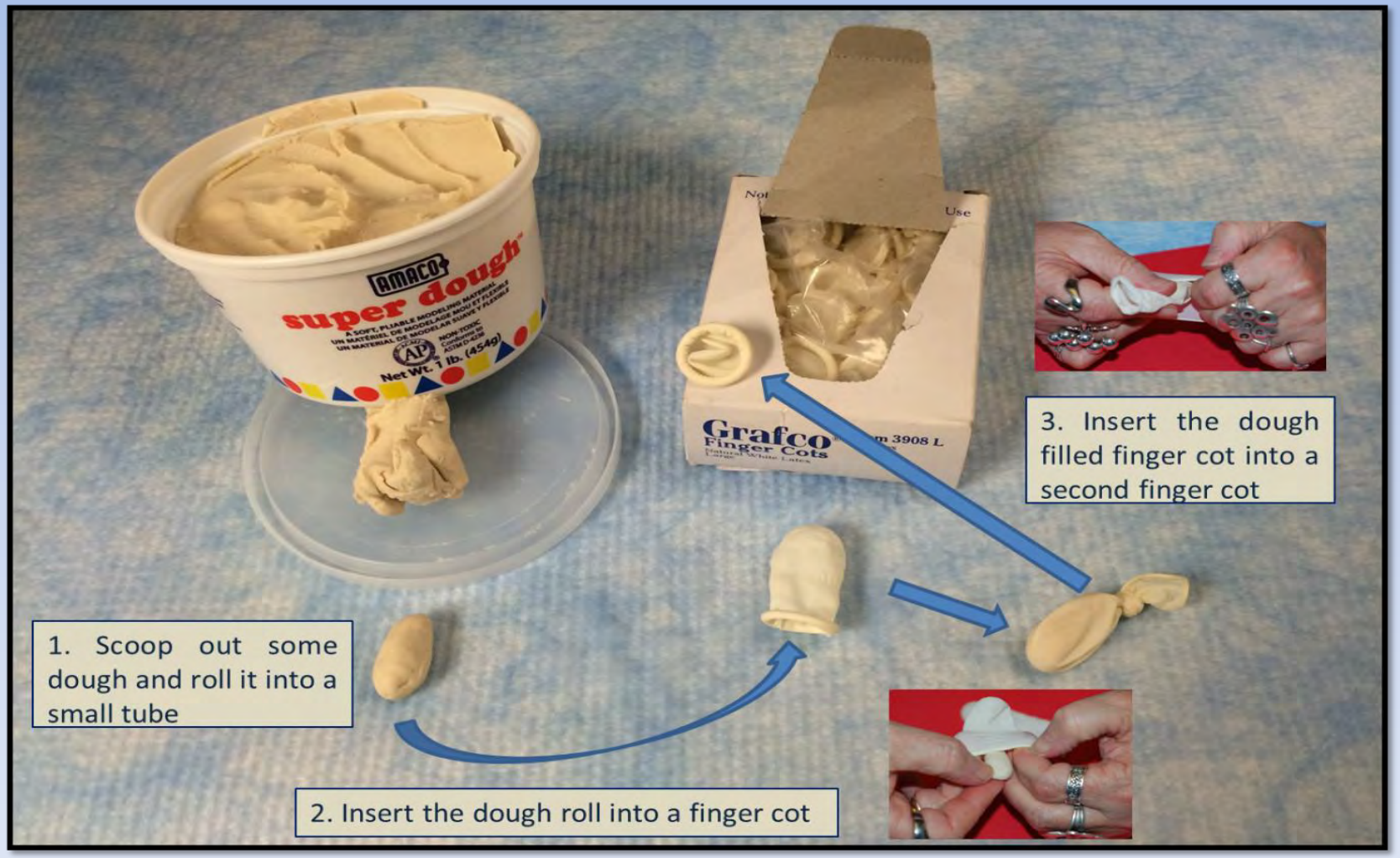
A. Theory/description



B. Live animal

Translational Training Tool:
Pink E.D Cap™

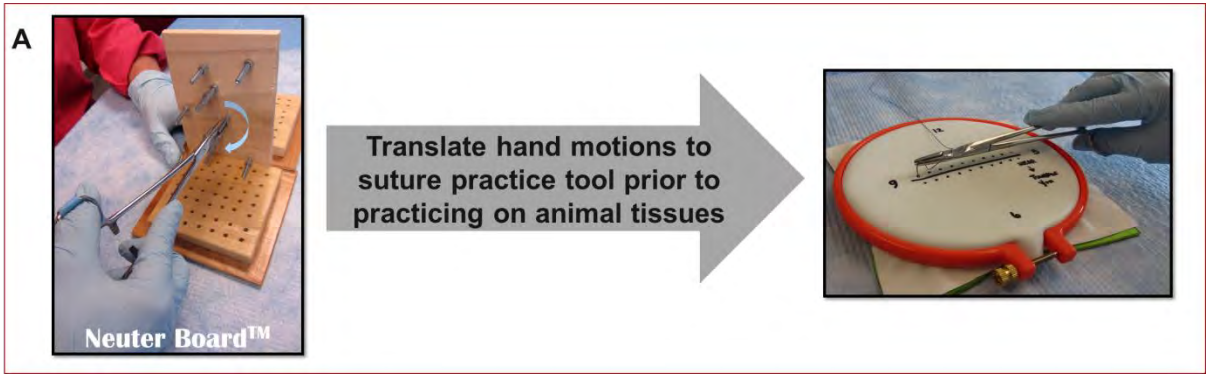
Pink E. D. Cap™

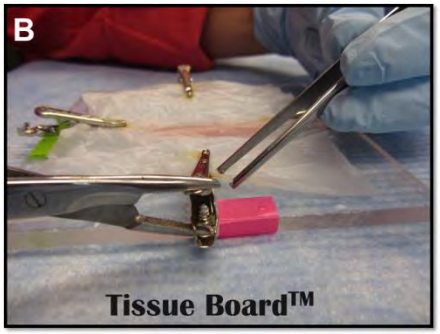


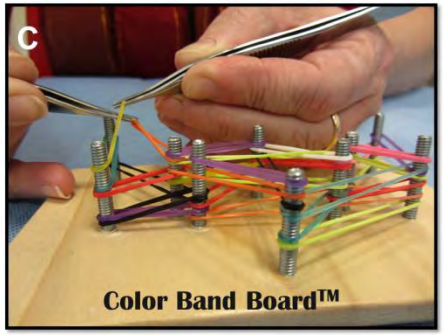
Adding some gel between the two layers of finger cots can give a more realistic feel to the tool

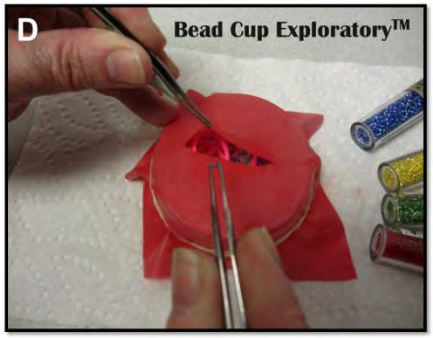
Final product

3 Ts™ Surgery training program and tools









Translational Training Tools™

The 3 Ts Serving the 3 Rs

The CARE Training Team has put a significant amount of time and effort into the creation of the 3 Ts methods and tools. We are pleased to be able to share the information in this manual with you. We welcome your comments and feedback and trust that you will respect that the information in this manual is the intellectual property of Wendy O. Williams, David E. Mooneyhan and Christine M. Peterson of the Center for Animal Resources and Education (CARE) at Cornell University.

We ask that you please not copy, reproduce or present the material in this manual without permission from the authors.

Thank you from Wendy, Dave and Christine.

ras.research.cornell.edu/care/3T

Translational Training Tools™

The 3 Ts Serving the 3 Rs

https://www.ras.research.cornell.edu/care/3T.html

Thank you!

Any Questions?