



UNITED STATES  
DEPARTMENT OF VETERANS AFFAIRS

# Modeling Cardiovascular Disease to Improve Human Health

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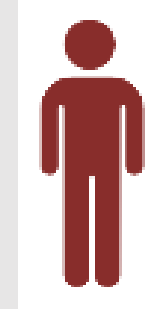


## Fast Facts: Why is This Research Important?



Globally & Nationally #1 Cause of Death  
= Cardiovascular Disease!

Current Leading Causes for Death in Colorado:  
#1 – Cancer  
#2 – Heart (Cardiovascular) Disease



### Men:

- Higher Disease Rate
- Progression: common under 60 years of age



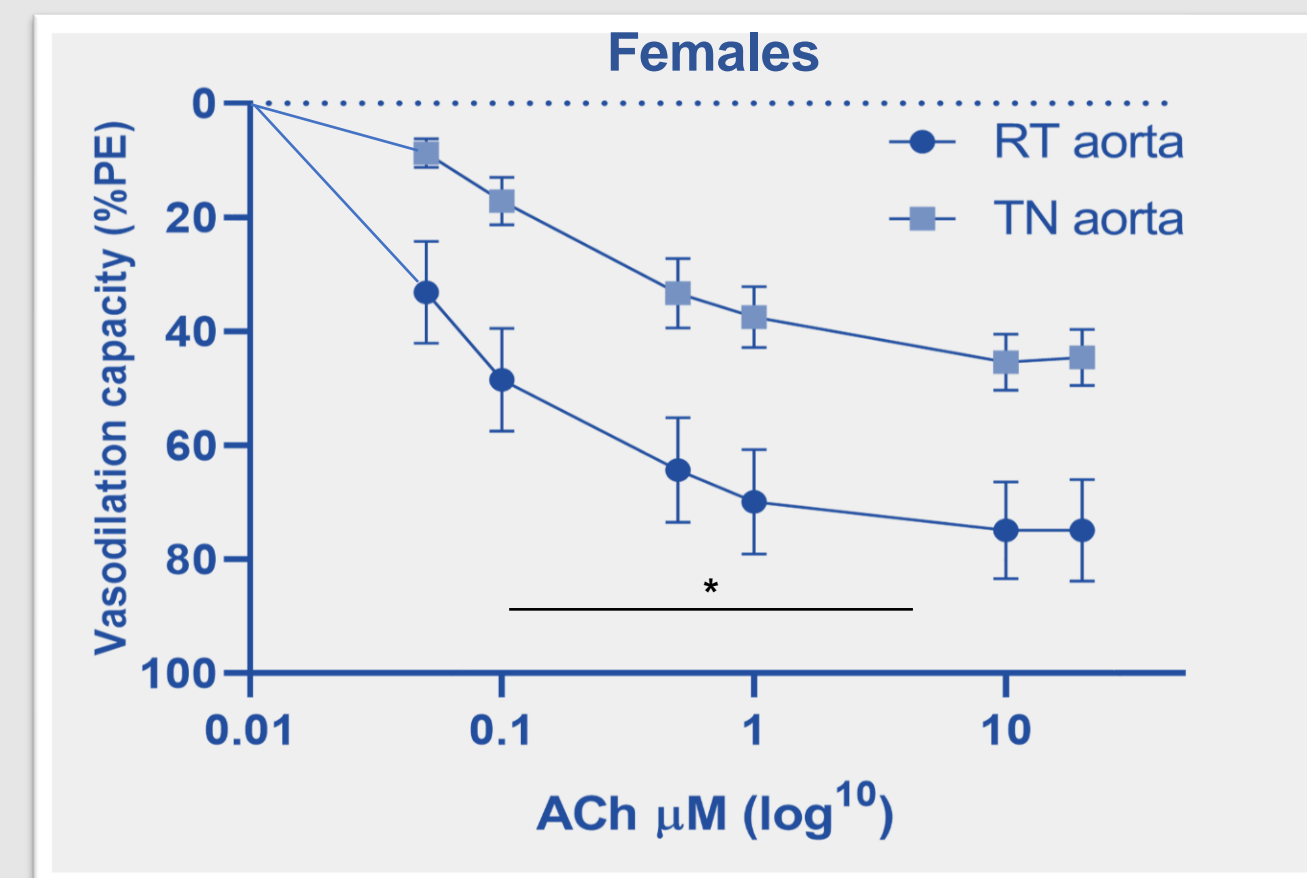
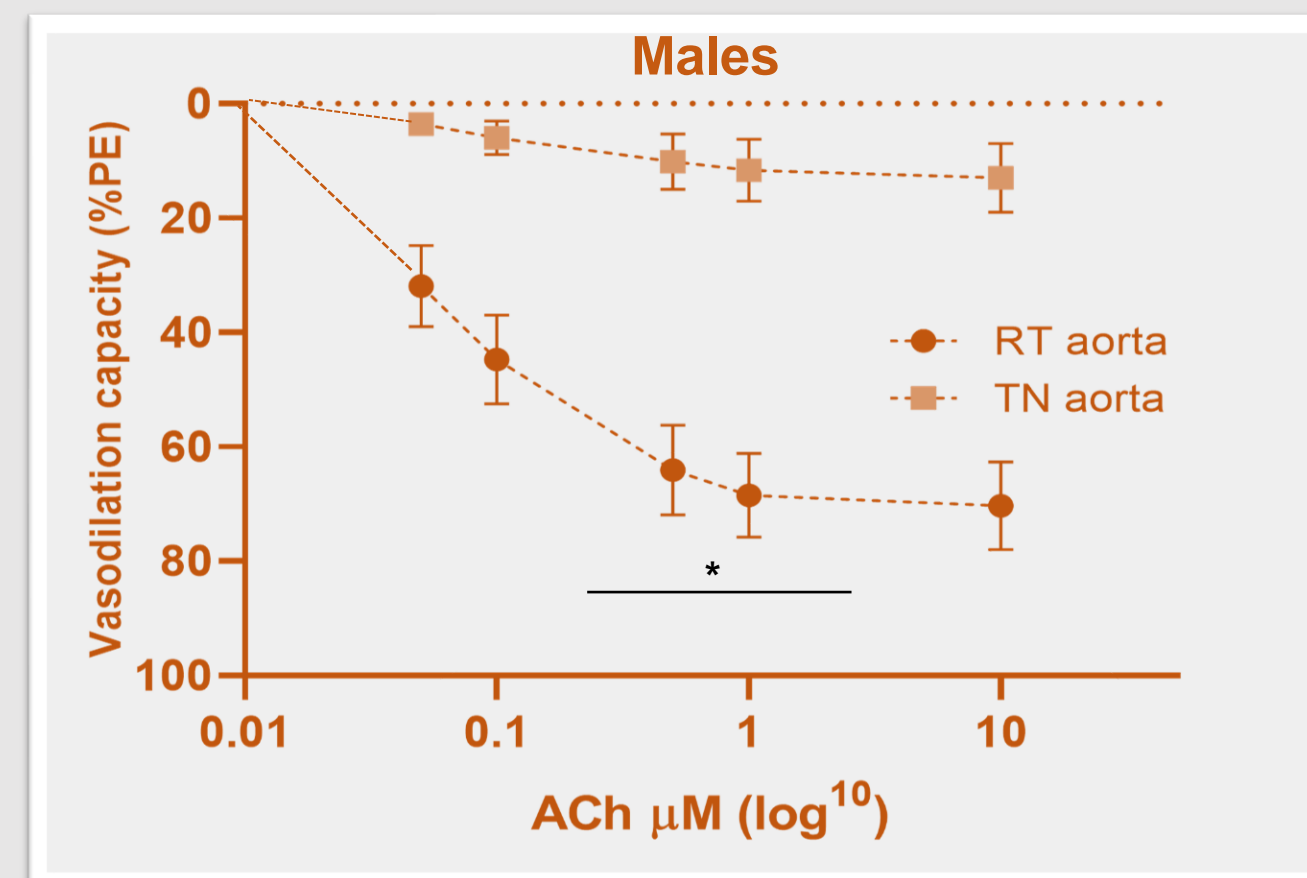
### Women:

- #1 Cause of Death
- Progression: most common over 60 years of age

## The Research:

**Primary Question:** What causes the disease differences between sexes, and can this be a target for new treatments of cardiovascular disease?

A) Can we use a rat model to mimic the human sex differences seen in cardiovascular disease?



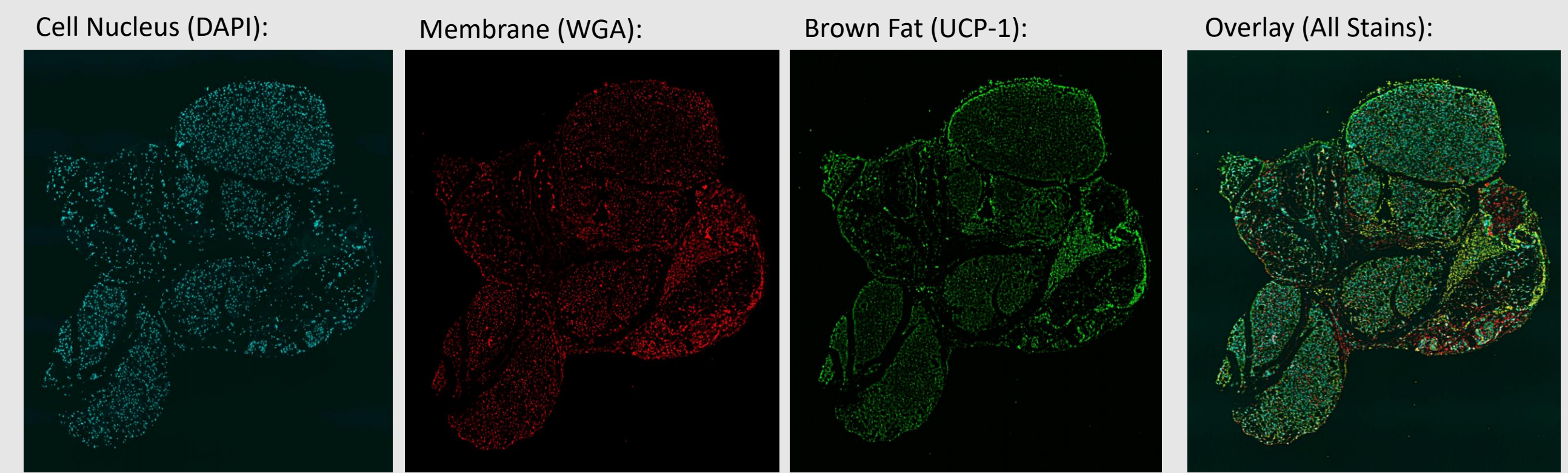
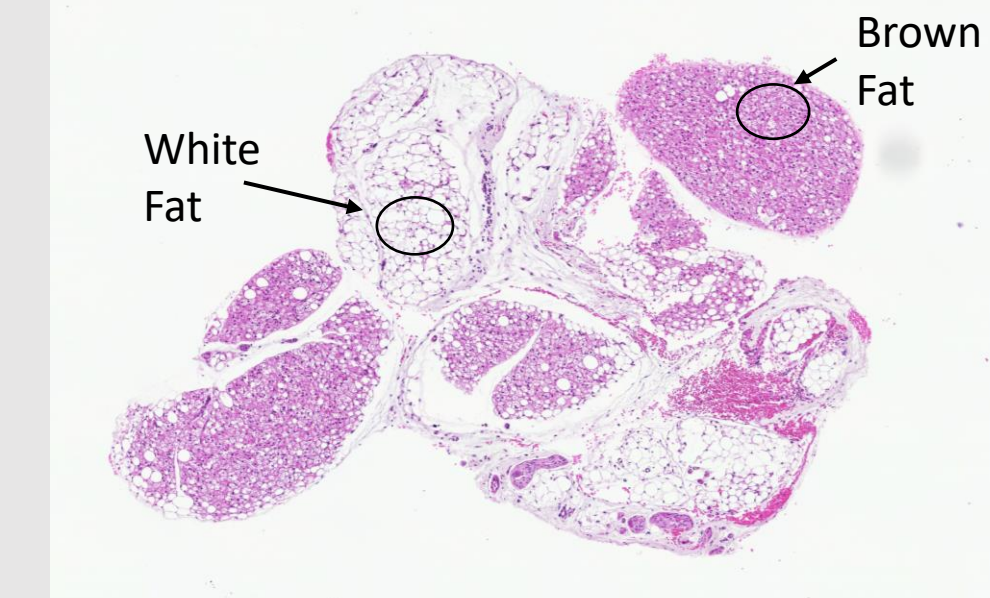
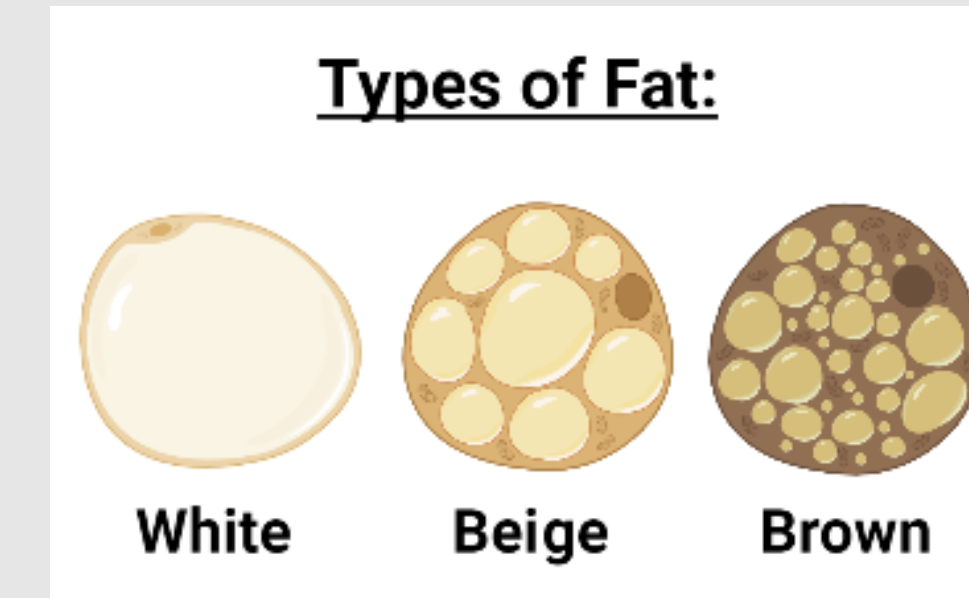
\*Definitions: Vasodilation capacity = extent of vessel expansion (0-100%); PE = Phenylephrine (constrictor); ACh = Acetylcholine (dilator); RT = Room Temperature Housed, 75°F; TN = Rat Thermoneutral - housed, 86°F.

We found that we can mimic human cardiovascular disease in rats by adjusting the housing temperature from RT (75°F) to TN (86°F), including sex differences. As shown above, all the rats that lived in TN had a decrease in the vessels ability to expand. This is even lower in males.

## The Research:

Previous studies have shown that the type of fat that surrounds blood vessels may contribute to cardiovascular disease.

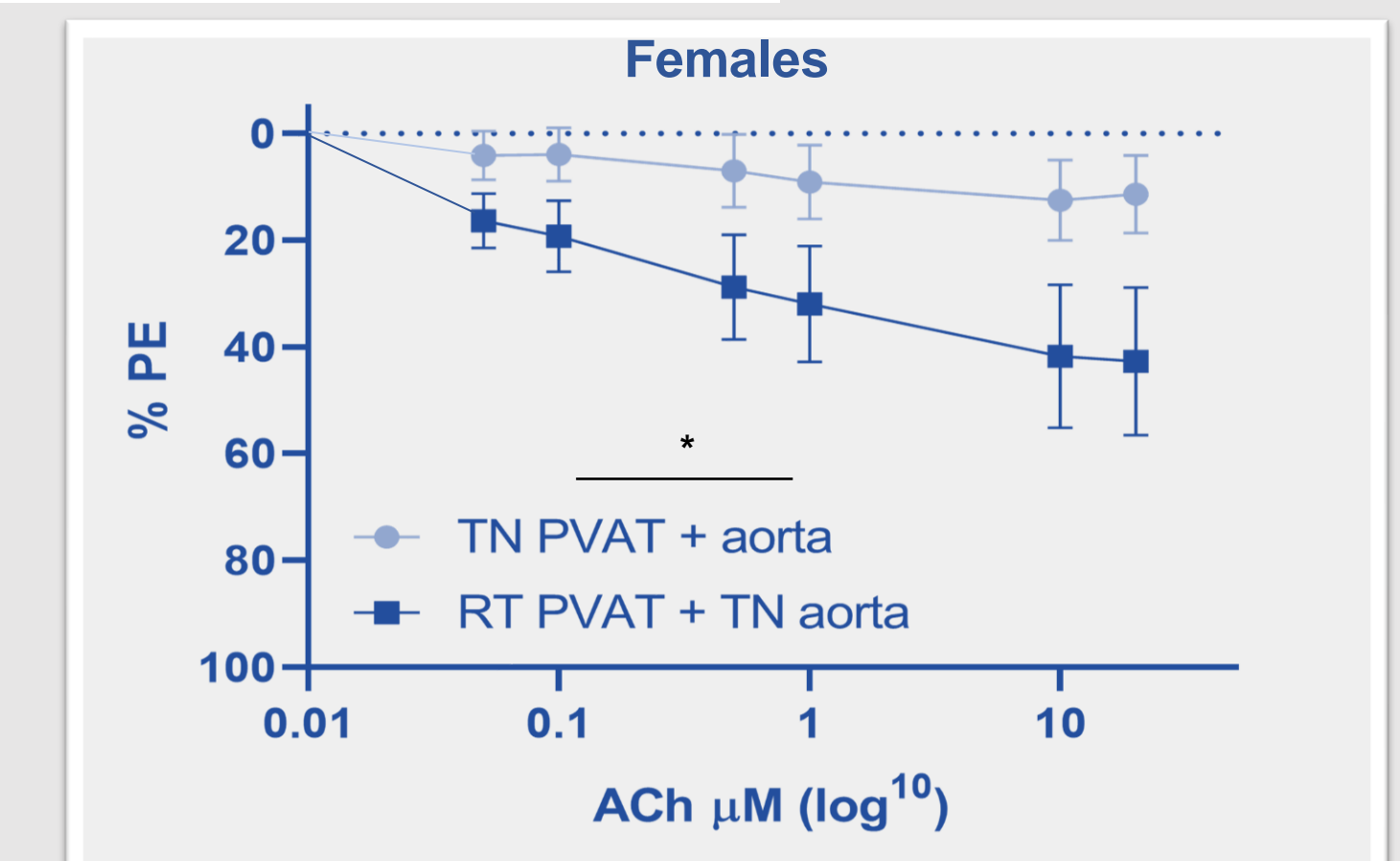
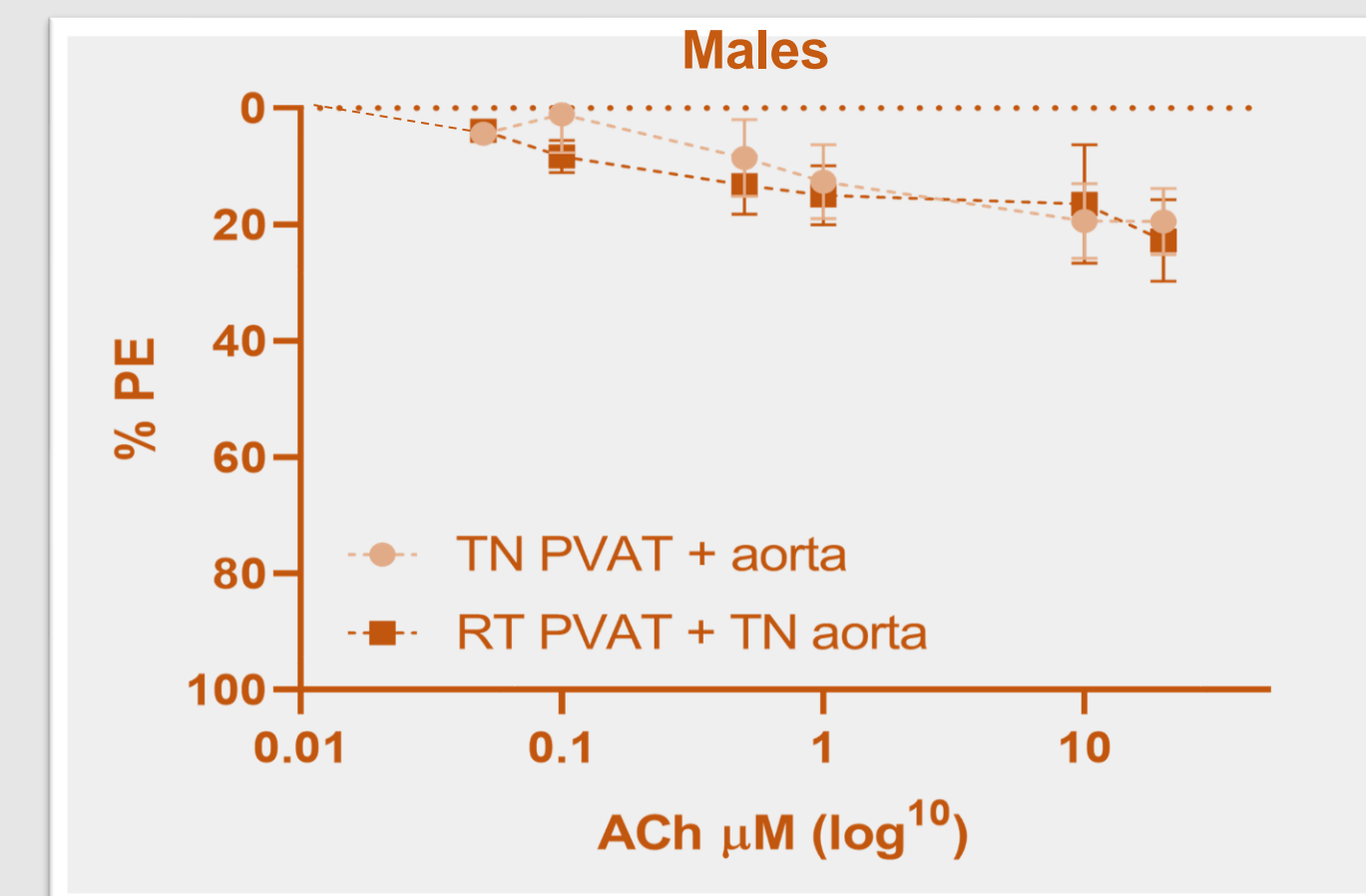
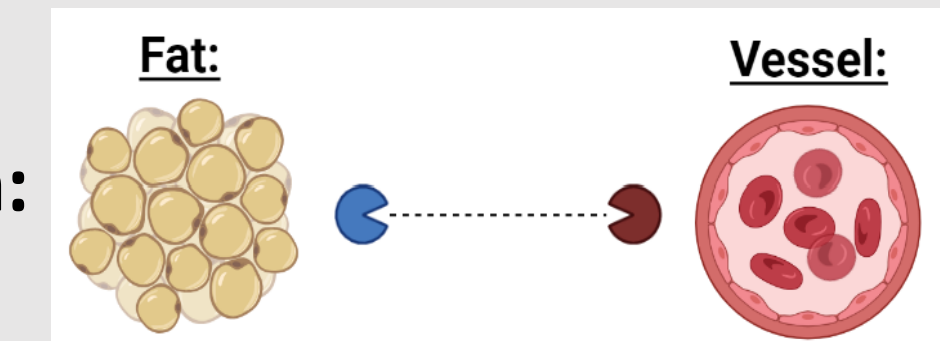
B) Can we measure the difference between types of fat?



We can visually show the differences between brown fat and white fat and calculate the amount of each present in a sample.

C) Can fat and blood vessels communicate to each other, and can vessel malfunction be the result of the “wrong” type of fat surrounding the vessel?

Fat ↔ Vessel Communication:



Fat from a RT rat put around a vessel from a diseased rat repairs part of the vessel malfunction, but only in females. This gives us a focus for future investigations into disease sex differences.

## The Goals:



❖ Improved Treatment Options



❖ Improved preventative care



❖ Improve human health and life span

### Future Directions:

- Test natural remedies to treat symptoms of disease
- Determine specific targets for future treatments