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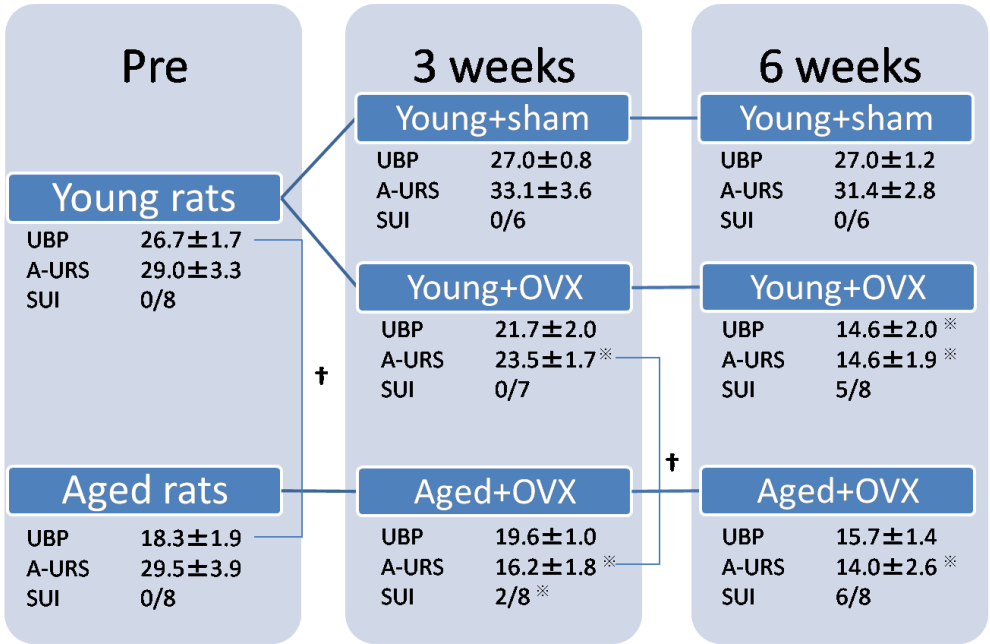
THE EFFECT OF OVARIECTOMY ON URETHRAL RESPONSES DURING SNEEZE REFLEX IN OLD VERSUS YOUNG ADULT RATS

Hypothesis / aims of study
Stress urinary incontinence (SUI) is common in the elderly population, suggesting that aging contributes to its etiology. We reported that estrogen deficiency impairs the urethral continence reflex to develop SUI in rats. The present study therefore examined how aging and ovariectomy (OVX) affect the urethral continence mechanism that prevents sneeze-induced SUI in rats.

Study design, materials and methods
Young adult (3 months) and aged (12 months) female Sprague-Dawley rats underwent bilateral OVX or sham operation. After 3 or 6 weeks, urethral responses and sneeze-induced leak point pressure (SLPP) were evaluated. Sneeze reflex was induced by a rat's whisker cut and inserted into the nostril. Urethral responses were measured using a microtransducer tipped catheter inserted to the middle urethra from the urethral orifice. The amplitude of urethral responses during sneezing (A-URS) and urethral baseline pressure (UBP) was evaluated.

Results
In sham operated aged rats, UBP, but not A-URS, was significantly decreased than in sham operated young rats. In 3-week OVX rats, A-URS was significantly decreased compared to sham rats in both young and aged groups, and the OVX-induced reduction in A-URS was more pronounced in aged vs. young rats (Table). Six weeks after OVX, in both young and aged groups, a significant decrease in A-URS was similarly observed in OVX rats compared to sham rats. In S-LPP measurements, neither young 3-week OVX nor sham rats leaked during sneeze. However, SUI during sneeze occurred in 2 out of 8 aged 3-week OVX rats, and S-LPP was 76.9 ± 10.2 cmH_2O in 2 incontinent rats. After 6-week OVX, the similar number of young (5/8) and aged rats (6/8) had SUI during sneeze (Table).

Table: Time course of urethral functions. The values of UBP and A-URS represent the mean ± SE. The number of SUI represents incontinence rats per total rats.



sham: sham operated rats **UBP**: urethral baseline pressure (cmH_2O)
OVX: ovariectomized rats **A-URS**: amplitude of the urethral pressure response during sneezing (cmH_2O)
SUI: stress urinary incontinence rats per total rats number
†: P<0.05 vs. young rats in the same timeline group
※: P<0.05 vs. sham operated rats in the same timeline group

Interpretation of results
The current results indicate that: (1) aging per se is more likely to impair smooth muscle urethral function (represented by UBP) than striated muscle urethral reflex activity (represented by A-URS), (2) aging can enhance the effect of estrogen deficiency (OVX) on the sneeze-induced urethral continence reflex, leading to SUI in aged rats with 3-week OVX, which showed a greater decrease in A-URS compared to young 3-week OVX rats and (3) long-term (6 weeks) estrogen deficiency can induce

SUI during sneeze irrespective of age.

Concluding message

Thus it seems likely that estrogen deficiency plays a significant role in inducing SUI and that aging acts as an additional factor to accelerate the disease process of SUI.

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What were the subjects in the study?	**ANIMAL**
Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?	**Yes**
Name of ethics committee	**University of Pittsburgh Institutional Animal Care and Use Committee**