

Author(s) Karl-Dietrich Sievert ^{1, 2)} , Mustafa Emre Bakircioglu ¹⁾ , Lora Nunes ¹⁾ , Michael Muscheck ¹⁾ and Tom F. Lue ¹⁾
Institution, city, country ¹⁾ University of California, San Francisco, School of Medicine Department of Urology ²⁾ Westfälische Wilhelms-Universität Münster Klinik und Poliklinik für Urologie
Title (type in CAPITAL LETTERS, leave one blank line before the text) LABOR AND/OR ARTIFICIAL MENOPAUSE AS A CAUSE OF FUNCTIONAL AND ULTRASTRUCTURAL CHANGES IN RAT BLADDER, BLADDER NECK AND URETHRA MUSCLE <u>Aims of Study</u> This study was designed to examine the effect of delivery and/or menopause on the function of bladder, bladder neck and urethral sphincter and to determine ultrastructural changes. <u>Methods</u> Virgin (n=10) and post partum (n=32) rats were used. Virgin rats underwent cystometry and stress/sneeze-test as did the rats immediately following delivery and 8-weeks post delivery. After delivery 16 animals were additionally transvaginally ballooned. Four weeks after delivery (group I) or delivery and ballooning (group II) every second animal of group I and II was ovariectomized (III + IV). Tissues from bladder, bladder neck and urethra were collected for electron microscopy and immunostaining for caveolin1 and 3 <u>Results</u> Significant higher bladder capacity and lower micturition pressure were detected following delivery when compared to virgin and 8-weeks postpartum rats. At 8 weeks post-delivery, a significantly higher residual bladder volume was detected. Significant increase of positive sneezing tests were revealed in group II and IV. Electron microscopy showed a significant decrease of sarcolemmal caveolae in smooth muscle of bladder, bladderneck and urethra of group II to IV; except in the bladder neck of group II (decrease not significant) and group III (increase). Caveolin-1 protein detected in smooth muscle cytoplasmic membrane was significantly decreased in all 4 groups in bladder and urethra 8 weeks postpartum when compared to virgin rats. Caveolin-3 detected in striated muscle membrane of the intrinsic sphincter (mid urethra) was significantly decreased in groups II to IV <u>Conclusions</u> These findings indicate that heavy birth trauma simulated by ballooning and/or menopause simulated by ovariectomy, causes most of the smooth muscle of the bladder and urethra to be less contractile with decreased sarcolemmal caveolae, a similar result in striated muscle. The alteration of caveolae, as well as the membrane protein caveolin, may play a significant role in functional differences after birth trauma and/or menopause.