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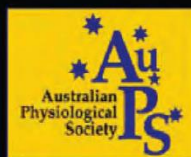
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Detrusor responses to antimuscarinics medications is consistent between juvenile and adult urinary bladders in porcine tissue

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Introduction & Objectives: The first-line pharmaceutical therapies for managing overactive bladder (OAB) are antimuscarinics (Moro et al., 2011). Their main mechanism of inhibiting spontaneous contractions in the urinary bladder during the filling phase by blocking the action of acetylcholine in the detrusor, has been identified in juvenile models (Veer et al., 2023). The prevalence of OAB increases with age and it is not clear whether this is due to changes in the urinary bladder tissue structure itself, alterations in lifestyle or other causes (Suskind, 2017). In order to assess the changes to urinary bladder itself, this study aims to find the differences in the ability of commonly prescribed antimuscarinics to inhibit contractions of the detrusor and compare these responses in juvenile and adult porcine tissues.

Methods: Strips of porcine detrusor from the adult or juvenile model were mounted in carbogen-gassed Krebs-bicarbonate solution at 37°C. The tissues were paired with carbachol concentration-response curves performed in the absence or presence of oxybutynin (1µM), solifenacin (1µM), darifenacin (100nM), tolterodine (1µM), trospium (100nM) and fesoterodine (100nM). Concentrations were chosen to ensure complete concentration-response curves in response to carbachol. pEC50 values for each curve were analysed and estimated affinities calculated. Ethical approval was not required for this study as tissues were sourced from the local abattoir after slaughter for the routine commercial provision of food.

Results: A right parallel shift was produced from the control in the juvenile detrusor for all antimuscarinics, with estimated affinities calculated for oxybutynin (7.47, n = 10), solifenacin (6.73, n = 8), darifenacin (7.58, n = 11), tolterodine (8.09, n = 8), trospium (8.69, n = 8) and fesoterodine (8.67, n = 8). A right parallel shift was produced from the control in the adult detrusor for all antimuscarinics, with estimated affinities calculated for oxybutynin (7.44, n = 9), solifenacin (6.63, n = 8), darifenacin (7.95, n = 9), tolterodine (7.93, n = 8), trospium (9.30, n = 9) and fesoterodine (8.54, n = 8). Comparisons of estimated affinities for each antimuscarinic between juvenile and adult tissues revealed no differences in each tissue's functional response to the six antimuscarinics ($p > 0.05$).

Conclusions: Although preliminary, with this study ongoing, there appears to be no significant differences between detrusor functional responses to antimuscarinics of differently aged porcine samples. Further supporting that these medications can assist in the treatment of OAB and lower urinary tract symptoms in the detrusor layer. Differences in compliance may be due to lifestyle or behavioral changes with age rather than alterations in the tissues ability to respond to the prescribed medication themselves.

References

- Moro, C., Uchiyama, J., & Chess-Williams, R. (2011). Urothelial/lamina propria spontaneous activity and the role of M3 muscarinic receptors in mediating rate responses to stretch and carbachol. *Urology*, **78**(6), 1442.e1449-1415. <https://doi.org/10.1016/j.urology.2011.08.039>
- Suskind, A. M. (2017). The Aging Overactive Bladder: A Review of Aging-Related Changes from the Brain to the Bladder. *Curr Bladder Dysfunct Rep*, **12**(1), 42-47. <https://doi.org/10.1007/s11884-017-0406-7>
- Veer, Vineesha, Chess-William, Russ, & Moro, Christian. (2023). Antimuscarinic actions on bladder urothelium and lamina propria contractions are similar to those observed in detrusor smooth muscle preparations. *Neurourol. Urodyn.* <https://doi.org/https://doi.org/10.1002/nau.25176>