Methods of increasing the reliability of Schild analysis for atropine antagonism at muscarinic acetylcholine receptors in porcine urinary bladder

Alex Shimanovsky, Wesley Tong, Cristina Trambitas, & Megan Yamamura
Honours Biology & Pharmacology Programme, McMaster University, Hamilton

1. Previous studies by our colleagues showed a depression of the maximum response to muscarinic acetylcholine receptor agonists in porcine urinary bladder in the presence of atropine. This contradicts the characterization of atropine as a competitive antagonist. This study investigates the methods used by our colleagues and tries to determine an optimal method for obtaining a $pA_2$ value for atropine in the porcine urinary bladder.

2. Eserine (10 µM) caused a steady increase in smooth muscle contractility. This result suggests that spontaneous release of endogenous acetylcholine might interfere with quantification of muscarinic acetylcholine receptor function in this tissue.

3. Hexamethonium (100 µM) did not abolish the eserine induced response, and did not change the $pEC_{50}$ value for acetylcholine (7.7 ± 0.30 in the absence and 7.6 ± 0.3 in the presence of hexamethonium). Nor did hexamethonium affect the maximum response to acetylcholine.

4. Denervation by cold-storage (4°C) of the tissues for 4 days reduced the eserine response by 60%. Pre-exposure of tissues to 20 µM acetylcholine reduced the eserine response by 66%. However, the eserine response was not eliminated.

5. This experiment failed to find an optimal method for determining a $pA_2$ value for atropine in the porcine urinary bladder; however, it provided a stepping stone for future investigations of atropine antagonism in the porcine urinary bladder.