In the present study, we have investigated the morphological changes including bladder weight, % fibrosis, and nC/C ratio phenotype SMC in rat urinary bladders with obstruction.
Our results seem to suggest that bladder outflow obstruction induces a rapid increase in bladder mass characterized by a smooth muscle hypertrophy and hyperplasia followed by an increase in connective tissue elements results from the increase in bladder weight and change in % Fibrosis.
Bladder outflow also causes a conversion of contractile SMC phenotype into synthetic or intermediate phenotype, and this modulation of SMC phenotype may play an important role in bladder contractile dysfunction secondary to outflow obstruction. Much research remains to be done, but our results suggest that synthetic phenotype may secrete some extracellular matrix proteins which leads to a contractile dysfunction of bladder SMC.

The difference between contractile type and synthetic type in morphology

	contractile type	synthetic type
Size and shape	Spindle	Round or/and oval
Background	Collagen, elastin	Glycosaminoglycan
Myofilament	↑ ↑	↓
Rough ER	↓(+)	↑ ↑(+)
Golgi apparatus	↓(±)	↑ ↑(±)
Free ribosome	↓(+)	↑ ↑(+)
Mitosis	↓(+)	↑(−)
Lysosome	(±)	(++)
Dense body	(±)	(++)

REFERENCES
Molecular and Cellular Biochemistry. 190: 105-118, 1999.

33

Author(s):
T Yamanishi, MH Hawthorn, CR Chapple, K.Yasuda*, R Chess-Williams
Institution, city, country:
Royal Hallamshire Hospital and University of Sheffield, Sheffield,UK, Koshigaya Hospital, Dokkyo University, Saitama, Japan*

Title (type in CAPITAL LETTERS, leave one blank line before the text):
ROLE OF TYROSINE KINASE IN MEDIATING NORADRENALINE-INDUCED CONTRACTIONS IN BENIGN PROSTATIC HYPERPLASIA

Aims of study: Alpha-adrenoceptors have been characterised into 3 subtypes (α1A, α1B and α1D). All appears to be G-protein linked receptors coupled to calcium mobilisation via the activation of phospholipase C. It has recently become apparent that many G-protein linked receptors can also activate the tyrosine kinase/MAP kinase signalling pathway(1). The present study was performed to determine if activation of the tyrosine kinase/MAP kinase pathway plays a role in the α-adrenoceptor induced contraction of the human prostate.
Methods: Samples of human prostate were obtained from patients (aged 60-75 years) undergoing transurethral resection of the prostate for benign prostatic hyperplasia. Muscle strips were suspended under 1g tension in gassed Krebs solution. Cumulative concentration-response curves (CRCs) to noradrenaline were obtained in the presence of corticosterone (10μM), cocaine(10μM) and propranolol (1μM). Following the initial CRC, tissues were washed for 1hr and a second noradrenaline curve constructed in the presence of genistein (tyrosine kinase inhibitor), nifedipine, PD98059 (MAP kinase inhibitor), Wortmannin (phosphatidyl inositol kinase inhibitor), Cyclopiazonic acid and/or ryanodine. In some tissues KCl (100mM) was added after the completion of the CRCs to noradrenaline.
Results: Noradrenaline produced a slowly developing tonic contraction without the phasic component reported for some other tissues. Nifedipine (1μM) reduced significantly ($p<0.05$) the maximal response to noradrenaline to 57.4±7.4% of the initial control maximum (n=14). Genistein (30μM) also significantly ($p<0.05$) reduced the maximal response to noradrenaline to 56.2±3.5% (n=12). Nifedipine and genistein together caused a reduction in the maximal response to noradrenaline to 34.7±7.4% (n=7), which was a significantly ($p<0.05$) greater reduction than either agent alone. Ryanodine (n=8) or Cyclopiazonic acid (n=12), which can both deplete calcium from intracellular stores significantly ($p<0.05$ and $p<0.01$, respectively) reduced the maximal response to noradrenaline to 49.0± 8.0%and 45.5±4.4%, respectively. Ryanodine (30μM) plus genistein (30μM) almost completely abolished the maximal response to noradrenaline (n=6). However the MAP kinase inhibitor PD98059 (50μM) (n=6) or 100nM Wortmannin (n=10) did not significantly reduce the maximal response to noradrenaline (83.5±3.5% and 84.7±3.54% of the initial maximum, respectively). The maximal response to noradrenaline was only 48.3±7.6% of that to KCL, suggesting that extracellular calcium is not fully activated following stimulation by noradrenaline.
Conclusions: The tyrosine kinase activation would appear to be involved in the α-adrenoceptor mediated smooth muscle contraction of benign prostatic hyperplasia. However the MAP kinase pathway does not appear to be involved. The source of calcium used to cause contraction following tyrosine kinase activation appears to come from internal stores.
Reference: 1. Nature 380:541-544, 1996.