Testosterone-induced rat model of BPH

Model advantages:
The main advantage of the testosterone-induced rat model of BPH is that it presents an enlargement of the prostate sharing common characteristics with human BPH and thus allowing studies on the causative mechanism of BPH symptoms by specifically targeting the prostatic growth and its final consequences.

Pathophysiological features:

Prostate features:
The testosterone-induced rat model of BPH exhibits several common characteristics with the human pathology:

- Prostatic enlargement
- Both stromal and epithelial compartments proliferation (figure 1)

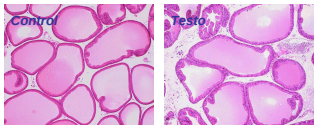
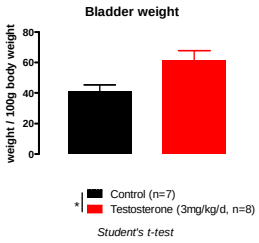


Figure 1: Representative microphotographs of rat prostatic lateral lobes stained with hematoxylin-eosin (HE) observed at x100 magnification in sesame oil (left panel) and testosterone (right panel) treated rats (3 weeks, 3 mg/kg/d) (Pelvipharm, internal data).

Bladder features

- Abnormal bladder function similar to that of patients with lower urinary tract symptoms associated with benign prostatic hyperplasia: increase in bladder capacity, in maximal amplitude of bladder contractions and in residual volume, occurrence of non voiding contractions
- Bladder hypertrophy



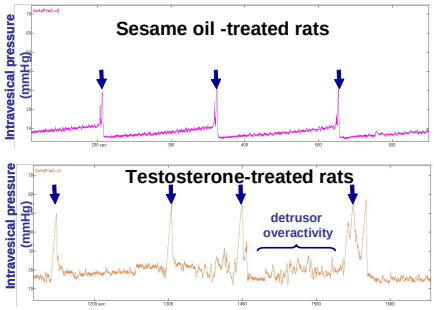


Figure 2: Representative cystometrograms in conscious testosterone or vehicle-treated rats. (Pelvipharm, internal data)

Urethra features

- Increase in urethral pressure
- Increase in urethral phenylephrine-responsiveness *in vivo*

Summarized methodology:

The hormonal-induced prostate hypertrophy in rats is induced by the daily subcutaneous delivery of testosterone (figure 3).

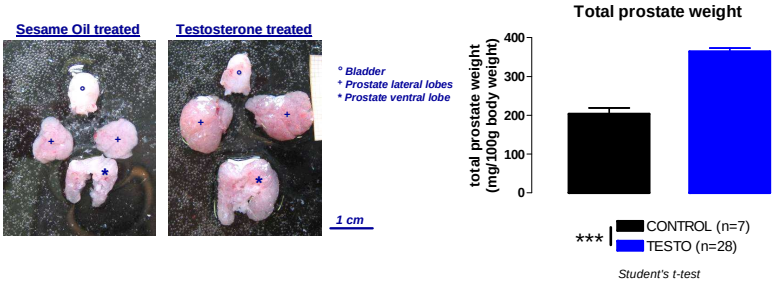


Figure 3: Evaluation of prostate Enlargement induced by daily s.c. testosterone injections (3mg/kg during 3 weeks) (Pelvipharm, internal data)

Related Pelvipharm bibliography:

Julia-Guilloteau, V. et al. **Eur Urol** (2006) : 5(2): 119 (EAU, 2006)

Links to applicable experimental skills:

- Administration routes / regimen
- Plasma / urine / tissue collection
- In vivo experiments – conscious animals
* Urodynamic evaluation (conscious)
* Urine collection - Metabolic cages
* Ejaculation
- In vivo experiments – anesthetized animals
* Erection elicited by pharmacological or electrical neural stimulation
* Ejaculation elicited by pharmacological or electrical neural stimulation
* Urodynamic evaluation (anesthetized)
* Bladder blood flow

- Organ bath studies (EFS / Pharmacological studies)
* Animal tissues
- Biochemistry (Plasma / Urine / Tissue)
* Spectrophotometric assays
* Protein expression and activity
- Histology
* Histomorphology
* Histomorphometry
* Oxydative fuorescence
- Immunohistology / Confocal microscopy
* Protein expression – immunohistochemistry / immunofluorescence
* Confocal microscopy