

Declaration.....	1
Acknowledgement.....	2
Table of Content.....	3
Table of Figures.....	7
Abbreviations.....	9
Abstract.....	11
Introduction	12
Initiation of smooth muscle contraction through different pathways.....	12
Smooth muscle contraction.....	13
The adrenergic pathway	16
Gross anatomy of the male reproductive tract	17
General development of the male reproductive system.....	18
The prostate.....	19
The human prostate – development, anatomy, histology and function.....	19
The rat prostate – development, anatomy, histology and function	21
The canine prostate in comparison	23
Benign prostatic hyperplasia	24
Benign prostatic hyperplasia – etiology and prevalence.....	24
The two lines of BPH therapy	25
The epididymis.....	26
Specificities of the human epididymis	28
Specificities of the rat epididymis	28
The ejaculatory process	29
Ejaculatory disorders - association to benign prostatic hyperplasia	29
Oxytocin	30
Oxytocin and its pathway	30
Oxytocin systemic and local.....	33
The relevance of possible crosstalk between oxytocin and arginine vasopressin	34
Receptor distribution and consideration of colocalization	34
Table 1: Expression of OT and OTR in male reproductive tissues of different species	39
Table 2 : Overview of the effect of OT on the male reproductive tract	42
Oxytocin related to emission and copulation.....	43
The effect of oxytocin on the contractility of the epididymis.....	43
Oxytocin in the prostate.....	44
The effect of oxytocin on the contractility of the prostate	44

Oxytocin-agonists and -antagonists	44
Aim of this study	49
Materials and Methods.....	50
Materials.....	50
Tissues.....	50
Devices.....	51
Software.....	52
Consumables.....	53
Reagents and substances	53
Active agents	56
Antibodies.....	56
Methods.....	57
Buffers and utility solutions.....	57
Preparation of rat collagen utility solution.....	59
Preparation of the different tissues for live imaging.....	60
Human prostate.....	60
Rat prostate	60
Human epididymis.....	61
Rat epididymis	62
Live imaging	64
Experiments with the rat or human prostate.....	64
Experiments with the neonatal rat epididymis	64
Experiments with the adult rat or human epididymis.....	65
Experiments using different segments of the rat or human epididymis	65
Experiments with S19 using three different concentrations of oxytocin.....	65
Experiments with oxytocin- and arginine vasopressin-antagonists.....	65
Experiments with pharmacological impairment of the adrenergic pathway	66
Injection experiments with fresh frozen (and thawed again) human prostate	66
Microinjection of the human prostate using Technovit® 3040	67
Microinjection of human prostate using MICROFIL® MV-Series	68
Using prostates from human body donors for micro-CT imaging	68
(Immuno-) Histochemistry.....	69
Fixation and slicing	69
Heidenhain's AZAN trichrome staining	70
Immunohistochemistry	70
Chromogenic immunohistochemistry.....	70
Immunofluorescence.....	72
Image capture of slides.....	72

Live imaging analysis.....	72
Statistical analysis.....	73
Results.....	75
Live imaging	75
The effect of oxytocin on the contractility of the prostate.....	75
The effect of oxytocin on the contractility of the human prostate.....	75
The effect of oxytocin on the contractility of the rat prostate (glands).....	77
The effect of oxytocin on the contractility of the epididymis	78
The difference of effect of oxytocin on the contractility of specific segments of the adult rat epididymis	78
The difference of effect of oxytocin on the contractility of specific segments of the neonatal rat epididymis.....	82
The effect of oxytocin on the contractility of the human epididymis.....	83
The effect of different concentrations of oxytocin on the contractility of S19 of the adult rat epididymis	84
Blocking oxytocin in S19 of the adult rat epididymis	86
Addition of oxytocin to adrenergically blocked S19 of the adult rat and S9 of the human epididymis	89
Distribution of the oxytocin receptor	91
Human prostate.....	91
Rat prostate	94
Rat epididymis	96
Fine structure of the human prostatic ductal system	98
Technovit® injection	98
MICROFIL® injection and reconstruction	99
Micro-CT imaging of human prostate.....	100
Micro-CT imaging of human prostate and corresponding histology.....	102
SMA orientation human prostatic gland vs duct.....	104
Discussion.....	105
A new analyzing method for live imaging data.....	105
The effect of oxytocin in the prostate	107
The effect of oxytocin in the epididymis	110
Oxytocin as a therapeutic.....	114
S19 as a model	116
The human prostatic duct system	117
Summary	119
Zusammenfassung	121
References	123
Publications, talks, posters and prizes/grants	138

Publications in peer-reviewed journals	137
Talks	138
Posters	138
Prizes/grants	140