

Contents	
Summary .....	7
Sommario .....	9
1. Chapter - Introduction.....	11
1.1. Neuroimaging .....	12
1.1.1. History of neuroimaging.....	12
1.2. MRI.....	14
1.2.1. History .....	14
1.2.2. Principles of NMR and MRI .....	15
1.2.3. Functional MRI (fMRI) .....	20
1.2.4. rs-fMRI, applications and pitfalls.....	22
1.3. Pain .....	24
1.3.1. Definitions and classification.....	24
1.3.2. Nociception and nociceptors .....	26
1.3.3. Pain pathways .....	28
1.3.4. Therapy: past, present, future .....	30
1.4. Aim of the thesis.....	33
1.5. References .....	35
2. Chapter - Investigating the specificity of functional MRI readouts in mice and rats .....	41
Abstract .....	42
2.1. Introduction .....	42
2.2. Materials and methods.....	45
2.2.1. Animals .....	45

2.2.2. Data Acquisition .....	46
2.2.3. Data Analysis .....	48
2.3. Results.....	49
2.4. Discussion and conclusions .....	55
2.5. References .....	60
3. Chapter - Characterization of the response to acute and neuropathic pain in a mouse model of pain insensitivity .....	65
Abstract .....	67
3.1. Introduction .....	67
3.2. Materials and methods.....	70
3.2.1. Animals.....	70
3.2.2. Data acquisition .....	72
3.2.3. SNI surgery .....	73
3.2.4. Behavioural tests.....	74
3.2.5. Data Analysis .....	75
3.3. Results.....	76
3.4. Discussion and conclusions .....	83
3.5. References .....	89
4. Chapter - Discussion and conclusions .....	94
4.1. Suitability of se-fMRI protocols in rodents.....	95
4.2. Models of insensitivity to pain: why they can help to understand pain processing .....	98
4.3. Is Nav 1.7 a suitable pharmaceutical target for pain-relief? .....	101
4.4. References .....	103
Acknowledgements .....	108

List of publications .....	110
Conference proceedings .....	111
Curriculum Vitae.....	113