CONTENTS

Particulars	Page No.
PREFACE	i
ACKNOWLEDGEMENT	iii
ABBREVIATIONS	vi
LIST OF FIGURES	viii
LIST OF TABLES	xv
1. INTRODUCTION	1
2. LITERATURE REVIEW	
2.1 Ischemic Stroke	6
2.2 Blood Supply to Brain	6
2.3 Treatments for stroke	7
2.4 Non-steroidal Anti-inflammatory Drugs (NSAIDs) and its properties	8
2.4.1 Piroxicam	9
2.4.1.1 Chemical Structure	10
2.4.1.2 Anti-oxidant phenomenon	10
2.5 Brain Attractors	12
2.6 Electroencephalography (EEG) and signal analysis techniques	12
2.7 Result of Literature search	17
2.8 Hypothesis / Objectives	18
3. MATERIALS AND METHODS	
3.1 Chemicals and consumables	21
3.2 Animals	21
3.3 Middle Cerebral Artery Occlusion (MCAo) model	21
3.4 Dose optimization of Piroxicam	25
3.5 Estimation of cerebral infarct volume and neurological deficit	28
3.6 Neurobehavioral assessment	33
3.7 Motor function deficit evaluation by Rota rod test	34
3.8 Statistical analysis	34
3.9 Conclusion	36

4 EEG RECORDINGS ANALYSIS TECHNIQUES AND FUNCTIONAL RECOVERY AFTER ISCHEMIC STROKE BY ADMINISTRATION OF PIROXICAM DRUG

4.1 Background of Electroencephalography (EEG) 38
4.2 Physiological Basis of EEG Activity 38
4.3 EEG patterns and types of activity 39
4.4 EEG Electrode implantation 40
4.5 EEG equipment and EEG recording montages 40
4.6 Statistical analysis 41
4.7 Fast Fourier Transformation 42
4.7.1 Frequency Domain Analysis 42
4.7.2 Power Spectrum Density (PSD) 42
4.7.3 Analysis of EEG from Fronto-parietal region 46
4.7.4 Analysis of EEG from Occipital region 47
4.7.5 Analysis of EEG from Temporal region 48
4.7.6 Recovery after drug administration 49
4.7.7 Discussion 50

4.8 Autoregressive mathematical modelling 51
4.8.1 Power Spectrum 53
4.8.2 Analysis of EEG from Fronto-parietal region 54
4.8.3 Analysis of EEG from Occipital region 55
4.8.4 Analysis of EEG from Temporal region 56
4.8.5 Recovery after drug administration 57
4.8.6 Discussion 57

4.9 Lyapunov Exponents 58
4.9.1 Steady state behaviour 59
4.9.2 Lyapunov Exponents of EEG from fronto-parietal region 59
4.9.3 Lyapunov Exponents of EEG from Occipital region 62
4.9.4 Lyapunov Exponent of EEG from Temporal region 65
4.9.5 Discussion 67

4.10 Correlation Dimensions 69
4.10.1 Analysis of EEG from Fronto-parietal region 70
4.10.2 Analysis of EEG from Occipital region 71
4.10.3 Analysis of EEG from Temporal region 72
4.10.4 Discussion 72

4.11 Autocorrelation Dimensions 74
4.11.1 Analysis of EEG from Fronto-parietal region 75
4.11.2 Analysis of EEG from Occipital region 78
4.11.3 Analysis of EEG from Temporal region 81
4.11.4 Discussion 83

4.12 Wavelet Transformation
4.12.1 Discrete Wavelet Transformation 84
4.12.2 Analysis of EEG from Fronto-parietal region 90
4.12.3 Analysis of EEG from Occipital region 96
4.12.4 Analysis of EEG from Temporal region 102
4.12.5 Discussion 108

4.13 Neural Network
4.13.1 Feed Forward Network 113
4.13.2 Algorithms 114
4.13.3 Neural network training phase 115
4.13.4 Performance plot 116
4.13.5 Training State plot 117
4.13.6 Discussion 118

4.14 Conclusion 120

5 Summary 122

6 Conclusion 130

7 References 135

APPENDIX- I

MATLAB PROGRAMS

1.1 Fast Fourier Transformation 151
1.2 Lyapunov Exponents 152
1.3 Correlation Dimension 156
1.4 Autocorrelation Dimension 159
1.5 Neural Network 160

RESUME WITH PUBLICATION DETAILS 167