

## CONTENTS

<b>INTRODUCTION</b>	1
OBJECTIVES OF THE PRESENT STUDY	6
<b>LITERATURE REVIEW</b>	7
NEURAL INNERVATION OF THE PANCREAS	8
CENTRAL NERVOUS SYSTEM REGULATION OF INSULIN SECRETION	11
FACTORS AFFECTING INSULIN SECRETION FROM PANCREATIC $\beta$ -CELLS	12
ROLE OF NEUROTRANSMITTERS IN INSULIN REGULATION	17
PANCREATIC REGENERATION AND $\beta$ -CELL GROWTH	22
FACTORS REGULATING $\beta$ -CELL GROWTH	27
NEUROTRANSMITTERS AS GROWTH SIGNALS	29
SEROTONIN	31
CLASSIFICATION OF 5-HT RECEPTORS	33
5-HT AND CELL PROLIFERATION	37
<b>MATERIALS AND METHODS</b>	43
BIOCHEMICALS AND THEIR SOURCES	43
ANIMALS	44
PARTIAL PANCREATECTOMY	44
<i>IN VIVO</i> DNA SYNTHESIS STUDIES IN PANCREAS	45
ESTIMATION OF CIRCULATING INSULIN BY RADIOIMMUNOASSAY	46
ISOLATION OF PANCREATIC ISLETS	47
5-HT QUANTIFICATION BY HPLC	47
5-HT RECEPTOR STUDIES USING [ <sup>3</sup> H] RADIOLIGANDS	49
5-HT <sub>1A</sub> RECEPTOR BINDING ASSAYS IN BRAIN	49
5-HT <sub>2C</sub> RECEPTOR BINDING ASSAYS IN BRAIN	50
BINDING STUDIES IN THE PANCREATIC ISLETS	50
5-HT <sub>1A</sub> RECEPTOR BINDING ASSAYS	50

5-HT <sub>2C</sub> RECEPTOR BINDING ASSAYS	51
REVERSE TRANSCRIPTION POLYMERASE CHAIN REACTION	53
INSULIN SECRETION STUDIES WITH 5-HT, 8-OH DPAT AND MESULERGINE	55
PANCREATIC DNA SYNTHESIS STUDIES <i>IN VITRO</i>	56
STATISTICS	57
<b>RESULTS</b>	58
BODY WEIGHT AND BLOOD GLUCOSE LEVEL	58
DNA SYNTHESIS IN THE REGENERATING PANCREAS	58
CIRCULATING INSULIN LEVEL	58
5-HT CONTENT IN THE BRAIN REGIONS OF EXPERIMENTAL RATS	58
5-HT AND 5-HIAA CONTENT IN THE PANCREAS OF EXPERIMENTAL RATS	59
5-HT, NE AND EPI LEVELS IN THE PLASMA OF EXPERIMENTAL RATS	59
NE AND EPI CONTENTS IN THE ADRENALS OF EXPERIMENTAL RATS	59
RECEPTOR ALTERATIONS IN THE BRAIN REGIONS OF EXPERIMENTAL RATS	60
5-HT <sub>1A</sub> RECEPTOR ANALYSIS	60
CEREBRAL CORTEX	60
BRAIN STEM	61
HYPOTHALAMUS	62
5-HT <sub>2C</sub> RECEPTOR ANALYSIS	63
CEREBRAL CORTEX	63
BRAIN STEM	63
HYPOTHALAMUS	64
RECEPTOR ALTERATIONS IN THE PANCREATIC ISLETS DURING PANCREATIC REGENERATION	65
5-HT <sub>1A</sub> RECEPTOR ANALYSIS	65
5-HT <sub>2C</sub> RECEPTOR ANALYSIS	65

INSULIN SECRETION STUDIES IN PANCREATIC ISLETS	66
<i>IN VITRO</i> DNA SYNTHESIS STUDIES IN PANCREATIC ISLETS	68
<b>DISCUSSION</b>	71
DNA SYNTHESIS IN PANCREAS AFTER PARTIAL PANCREATECTOMY	71
CIRCULATING INSULIN LEVELS DURING PANCREATIC REGENERATION	72
5-HT CONTENT IN THE BRAIN REGIONS DURING PANCREATIC REGENERATION	72
5-HT CONTENT IN THE PANCREAS AND PLASMA DURING PANCREATIC REGENERATION	73
EPI AND NE CONTENT DECREASED IN PLASMA AND ADRENALS DURING PANCREATIC REGENERATION	74
BRAIN 5-HT <sub>1A</sub> RECEPTOR ALTERATIONS	74
BRAIN 5-HT <sub>2C</sub> RECEPTOR ALTERATIONS	80
5-HT <sub>1A</sub> AND 5-HT <sub>2C</sub> RECEPTOR ALTERATIONS IN PANCREATIC ISLETS	83
SEROTONERGIC STIMULATION OF INSULIN SYNTHESIS AND SECRETION FROM PANCREATIC $\beta$ -CELLS <i>IN VITRO</i>	84
EFFECT OF 5-HT, 8-OH DPAT AND MESULERGINE ON ISLET DNA SYNTHESIS	86
<b>SUMMARY</b>	89
<b>CONCLUSION</b>	91
<b>REFERENCES</b>	93