

CONTENTS

Preface(vii)

Introduction.....(i)

SECTION - A

GENERAL DISCUSSION ABOUT MICE AND RATS 1

The Laboratory Mouse..... 2

Exterior Features of Mouse 2

Anatomical Peculiarities of Mouse 2

Housing of Mouse 3

Requirement of External Environment for Mouse 4

Nutritional Requirement of Mouse 4

Handling of Mouse..... 4

Breeding of Mouse..... 5

Inbred strains of Mouse..... 6

Estrus cycle of Mouse 6

Mating Technique of Mouse 6

Timed Pregnancies of Mouse..... 7

Sexing of Mouse..... 8

Life Span of Mouse..... 8

Common Diseases of Mouse..... 8

Collection of Blood from Mouse 8

Administration of Drug to Mouse 11

Euthanasia of Mouse 12

Data Related to Mice (Tables)..... 13

Table 1 : Some Physiological Data of Mouse..... 15

Table 2 : Milk Composition of Mouse 16

Table 3 : Blood Pressure of Mouse 16

Table 4 : Heart Rate of Mouse..... 16

Table 5 : Oxygen Consumption of Mouse..... 16

(x) *Contents*

Table 6	: Respiratory Frequency, Tidal Volume and Minute Volume of Mouse.....	16
Table 7	: Dimensions of Lung Respiratory Zones of Mouse.....	16
Table 8	: Erythrocyte and Hemoglobin values of Mouse	17
Table 9	: Leukocyte Counts of Mouse.....	17
Table 10	: Blood Platelet Counts of Mouse.....	17
Table 11	: Blood Carbohydrate of Mouse	18
Table 12	: Blood Electrolytes of Mouse.....	18
Table 13	: Blood Non-protein Nitrogenous Substances of Mouse .	19
Table 14	: Monoamines of Brain Tissue of Mouse.....	19
Table 15	: Liver Function Tests of Mouse.....	19
Table 16	: Excretion Products in Urine of Mouse	20
Table 17	: Typical Electroencephalograms of Mouse	20
Table 18	: Tolerance to Temperature Extremes of Mouse	20
Table 19	: Nutritional Requirement of Mouse.....	21
Table 20	: Parasitism in Mouse	23
Table 21	: Chemical Composition of Nervous Tissue of Mouse....	26
Table 22	: Tissue Growth and Renewal in Mouse.....	27
Table 23	: Inbred Strains of Mouse	38
The Laboratory Rat.....		46
Strains of Rat.....		46
Exterior Features of Rat		47
Anatomical Peculiarities of Rat.....		47
Housing of Rat		48
The Colony of Rat.....		49
Requirement of External Environment of Rat.....		49
Handling of Rat.....		49
Nutritional Requirement of Rat.....		51
Breeding of Rat		51
Estrus Cycle of Rat.....		52
Changes of Vaginal Smear during an Estrus Cycle of Rat.....		52
Mating Technique of Rat.....		53
Timed Pregnancies		53

Breeding Nucleus (Foundation Stock)	54
Life Span of Rat	56
Anaesthesia Techniques for Rat	56
Collection of Blood from Rat	57
Administration of Drugs to Rat	59
Common Diseases of Rat	62
Euthanasia of Rat	62
Data Related to Rats (Tables)	63
Table 1 : Some Important Biological and Physiological Data of Rat	65
Table 2 : Milk Composition of Rat	65
Table 3 : Blood Pressure of Rat	66
Table 4 : Heart Rate of Rat	66
Table 5 : Oxygen Consumption of Rat	66
Table 6 : Respiratory Frequency, Tidal Volume and Minute Volume of Rat	67
Table 7 : Dimension of Lung Respiratory Zones of Rat	67
Table 8 : Erythrocyte and Hemoglobin Values of Rat	67
Table 9 : Leukocyte Counts of Rat	68
Table 10 : Blood Platelet Counts of Rat	68
Table 11 : Blood Carbohydrate of Rat	68
Table 12 : Blood Lipids of Rat	69
Table 13 : Acid-Base Balance of Blood and Plasma of Rat	69
Table 14 : Blood Volume of Rat	69
Table 15 : Blood Electrolytes of Rat	69
Table 16 : Blood Non-Protein Nitrogenous Substances of Rat	70
Table 17 : Monoamines of Brain Tissue of Rat	70
Table 18 : Liver Function Tests of Rat	70
Table 19 : Renal Function Tests of Rat	70
Table 20 : Excretion Products in Urine of Rat	73
Table 21 : Chemical Composition of Nervous Tissue of Rat	76
Table 22 : Tolerance to Temperature Extremes of Rat	81
Table 23 : Typical Electroencephalograms of Rat	82

(xii) Contents

Table 24	: Nutritional Requirement of Rat	83
Table 25	: Parasitism in Rat	85
Table 26	: Chemical Composition and Physical Properties of Lymph of Rat	86
Table 27	: Tissue Growth and Renewal in Rat	91

SECTION - B

EXPERIMENTS ON MICE AND RATS 105

Experiment No. 1	: Behavioural Test in Mice	106
Experiment No. 2	: Test of Ataractic Agents by Electrical Stimulation of Pairs of Mice	110
Experiment No. 3	: Test of Analgesic Agents in Mice	111
Experiment No. 4	: Motor Deficit Test in Mice	113
Experiment No. 5	: Zwangsnagen Test in Mice	114
Experiment No. 6	: Nalorphine Antagonism Test in Mice	115
Experiment No. 7	: Suppression of Combativeness in Mice	116
Experiment No. 8	: Lenticular Opacity Test in Mice	117
Experiment No. 9	: Ptosis Test in Mice	118
Experiment No. 10	: Intracerebral Test in Mice	119
Experiment No. 11	: Anti-inflammatory Test by Adjuvant – Induced Arthritis in Rats	121
Experiment No. 12	: Anti-inflammatory Test by Peritoneal Capillary Permeability in Mice	122
Experiment No. 13	: Anti-inflammatory Test by Carrageenin Induced Pleurisy in Rats	123
Experiment No. 14	: Anti-inflammatory Test by Paw-Oedema in Rats	124
Experiment No. 15	: Anti-inflammatory Test by Cotton Pellet Granuloma in Rats	125
Experiment No. 16	: Anti-inflammatory Test by Inflammatory Exudation in Mice	125
Experiment No. 17	: Antipyretic Test in Rats	127
Experiment No. 18	: Hyaluronidase Inhibition in Mice	128

Contents (xiii)

Experiment No. 19	: Effect of Vagal Stimulation and of Histamine on gastric secretion of Rats.....	129
Experiment No. 20	: The Secretion and Digestive Action of Pancreatic Juice of Rats	130
Experiment No. 21	: Gastric Motility Test by Charcoal Meal in Mice.....	133
Experiment No. 22	: Gastric Ulceration by Pylorus Ligation in Rats.....	134
Experiment No. 23	: Test of Antiulcer Agents by Cold Restraint Ulcer (CRU) in Rats.....	136
Experiment No. 24	: Liver Function Tests of Rats	137
Experiment No. 25	: Liver Cancer Model in Rats	139
Experiment No. 26	: Kidney Function Tests of Rats	140
Experiment No. 27	: Saline Diuresis in Rats	142
Experiment No. 28	: Production of Renal Hypertension of Rats...	143
Experiment No. 29	: The Rate of Glucose Absorption in Rats.....	145
Experiment No. 30	: Alloxan Diabetes in Rats.....	146
Experiment No. 31	: Effect of Insulin on sugar of Rats.....	147
Experiment No. 32	: Preparation of Septal Lesions in Rat.....	148
Experiment No. 33	: Production of Anaphylactic shock in Rats ...	149
Experiment No. 34	: Oxytocin Cramping in Rats.....	150
Experiment No. 35	: A Test of Suppression of a Conditioned Response in Rats	151
Experiment No. 36	: Palpebral Test in Rats.....	152
Experiment No. 37	: Runway Test for thirsty Rats.....	153
Experiment No. 38	: Test for Dermal Absorption in Rats	154
Experiment No. 39	: Lacrimation Test in Rats	155
Experiment No. 40	: The Effects of Adrenalectomy and the Action of Cortin in Rats	156
Experiment No. 41	: Mode of Action of Gonadotropic Hormones in Rats.....	158
Experiment No. 42	: Pregnancy Test in Rats.....	159
Experiment No. 43	: Anti-fertility Test in Female Rats.....	160
Experiment No. 44	: Anti-fertility Test in Male Rats	161
Experiment No. 45	: Anabolic Androgenic Test in Rats	162

(xiv) Contents

Experiment No. 46	: General Directions for Blood Pressure Experiments in Rats	163
Experiment No. 47	: Determination of the Cardiac Output in Rats	164
Experiment No. 48	: Determination of Blood volume in Rats	166
Experiment No. 49	: Effects of Thyroidectomy and of Thyroxin on the Basal Metabolic Rate in Rats	168
Experiment No. 50	: Determination of Oxygen Consumption, Respiratory Quotient and Basal Metabolic Rate in Rats	170
Experiment No. 51	: Respiratory Rate, Tidal Air and Pulmonary ventilation of Rats.....	173
Experiment No. 52	: The Ileum of the Mouse	174
Experiment No. 53	: Anococcygeus Muscle Preparation of Rat ...	175
Experiment No. 54	: Fundus Strip of the Rat	176
Experiment No. 55	: The Duodenum of the Rat	178
Experiment No. 56	: The Ileum of the Rat	179
Experiment No. 57	: The Jejunum of the Rat	180
Experiment No. 58	: The Seminal Vesicle of the Rats	181
Experiment No. 59	: The Colon of the Rat	182
Experiment No. 60	: The Uterus of Rat	183
Experiment No. 61	: Test for Diuretic Activity in Rats	185
Experiment No. 62	: Test for Anticonvulsant Activity in Mice	187
Experiment No. 63	: Hypolipidemic Activity in Rat	188
Experiment No. 64	: Antitumor Activity in Mice by using Ehrlich Ascites Carcinoma (EAC) Cell line	190
Experiment No. 65	: Test for Respiratory Depressant Drug Effect in Rats.....	192
Experiment No. 66	: Wound Healing Activity in Rats by Excision Wound Model.....	194
Experiment No. 67	: Antiparkinson Activity in Rats.....	195
Experiment No. 68	: Test for Antishock Agents in Rats	197
Experiment No. 69	: Test for Hepatotoxicity in Mice	198
Experiment No. 70	: Antiemetic Activity in Wistar Rats	199

Instruments used for Mice and Rats Experiments

Surgical Instruments, Injections and Cannula used in
Laboratory Mice and Rats Experiments 203

Drug Doses used on Laboratory Mice and Rats

Table 1 : Drug Doses used on Laboratory Mice and Rats 211
Table 2 : Doses of Anaesthetics used for
Laboratory Mice and Rats 220
Table 3 : Drug Concentrations used for Isolated
Preparations of Mice and Rats 222
Table 4 : Sensitivity of Different Isolated Tissue of
Laboratory Rats Preparation to some
Biologically Active Substances 226
Table 5 : Composition of some Physiologic
Salt solutions used for Isolated Tissue
Preparations of Laboratory Mice and Rats 227
Table 6 : Experimental Details for some common Isolated
Preparations of Laboratory Mice and Rats 228

GUIDELINES FOR CARE AND USE OF
ANIMALS IN RESEARCH 230

GOOD LABORATORY PRACTICES (GLP) FOR ANIMAL
RESEARCH 233

References **241**

Appendix

Table of Profits 253
Table of Distribution of 't' 253
Table of Wilcoxon test on unpaired samples 255
Weights 257
SI Base Units 257
Some SI Derived Units 257
SI Derived Names with Special Names 258
Prefixes and Multiples used in SI 258
Units of Length 259

(xvi) Contents

Units of Volume (fluid or liquid)	259
Units of weight	259
Weight and Measures	260
Conversion Rules	261
Miscellaneous Conversion Factors.....	262
Miscellaneous Units of Measurement	264
Preparation of Percentage Solution	265
Index	289