TABLE OF CONTENTS

INTRODUCTION 1

References 3

CHAPTER I SIMULATION IN CELL POPULATIONS KINETICS 5

1.1. General Features of Simulation Technique 5
1.2. Principal Trends in the Development of Methods for Simulating Cell Proliferation Processes 7
1.3. Simulation Models of Cell Kinetics with a Deterministic Structure 8
1.4. Stochastic Simulation Models in Cell Kinetics 12
1.5. Simulation Modelling Software 19
1.6. Possible Uses of Simulation Modelling 24
References 29

CHAPTER II A SIMULATION MODEL FOR IN VITRO KINETICS OF NORMAL AND IRRADIATED CELLS 35

2.1. Introduction 35
2.2. Basic Premises of Unirradiated Cell Population Model 35
2.3. Basic Principles of Simulating Cell Inactivation after Exposure to Ionizing Radiation 39
2.4. Process of Formation of Radiation Cell Damage 44
2.5. Radiation Blocking of Cells in the Mitotic Cycle 47
2.6. Repair of Radiation Damage of Cells 49
2.7. Relation between Cell Radiosensitivity and Its Position in Cell Cycle 53
2.8. Criterion of Radiation Effect 54
2.9. Fractionated Irradiation 55
2.10. Information Available to Investigator in Conducting Simulation Experiments 57
References 58

Bibliografische Informationen
http://d-nb.info/880808950

digitalisiert durch DEUTSCHE NATIONAL BIBLIOTHEK

CHAPTER III SIMULATION AND ANALYSIS OF RADIOBIOLOGICAL EFFECTS IN CELL CULTURES 63

3.1. Introduction 63
3.2. Irradiation of the Synchronous Cell Population 68
3.3. The Effect of Ionizing Radiation (single Irradiation) on a Cell Culture in the Exponential Phase of Growth 73
3.4. Stationary State of LICH Cell Cultures 78
3.5. Effects of Fractionated Irradiation 85
3.6. Factorial Variance Analysis of Simulation Results 89
References 94

CHAPTER IV SIMULATION OF CONTROLLED CELL SYSTEMS 97

4.1. Introduction 97
4.2. Brief Description of the Model 98
4.3. The Dynamic and Stochastic Stability of the Model 102
4.4. Application of the Simulation Model. Simulation of Radiobiological Effects 109
References 112

CHAPTER V THE PROPERTIES OF CELL KINETICS INDICATORS 115

5.1. Introduction 115
5.2. Integral Cell Flow into Transitive Population 115
5.3. The Fraction of Labelled Mitoses Curve 127
References 129

CONCLUSION 131