

J. Surface Sci. Technol., Vol 25, No. 3-4, pp. 103-152, 2009
© 2009 Indian Society for Surface Science and Technology, India.

Drug-Receptor Interaction : Pharmacology, Binding and Thermodynamics – A Review

SANKAR P. MITRA

Acotrix Inc., 70 Walnut Street, Wellesley, MA 02148, USA

Abstract — Drugs by definition, are characterized as those agents that can bring a change in any living species and often used for therapeutic purposes. A large category of them exerts their physiologic effects by binding with naturally selective receptor(s) and thus making the drug-receptor interaction a widely studied subject, considering particularly the complex intracellular biochemistry, pharmacology and energetics involved in the entire event. The current review discusses several of those parameters like the nature of intracellular signaling associated with different receptor types, the quantitative aspects of binding models and related thermodynamics involved in the process.

Keywords : *Intra-cellular signaling, Ligand-receptor binding, Ligand-receptor Reaction Kinetics, Binding Affinity, Competitive Binding, Agonists and Antagonists, Drug Efficacy, Receptor Desensitization, Solvent's Role, Hydrophobicity, Membrane Fluidity, Ligand Structure, Thermodynamics, Entropy-Enthalpy Compensation.*

INTRODUCTION

What is a drug? The terminology applied to those chemical agents either of natural or synthetic origins, which can alter their normal or abnormal physiological actions when taken up by any living species [1]. Drugs can be classified in multiple ways, for example antibiotics, enzymes, enzyme blockers, chelating agents, intercalating agents or could be receptor mediated. Among those categories receptor-mediated ones are drawing major attention not just for their uses as agonists or antagonists to cure or prevent any ailment but also for recent uses as a guided carrier in delivering noxious agents to the targeted tissues for destroying any undesired or cancerous

For correspondence. E-mail : sankar_mitra@msn.com or smitra3554@charter.net. 102, Vassar Street, Worcester, MA 01602, USA