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Nota di contenuto	DNA INTERACTIONS WITH POLYMERS AND SURFACTANTS; CONTENTS; Preface; Contributors; 1 Polyelectrolytes. Physicochemical Aspects and Biological Significance; 1.1 Introduction; 1.2 Polyelectrolytes and Biological Function; 1.3 Electrostatic Interactions; 1.3.1 Ion Distributions and the Poisson-Boltzmann Equation; 1.3.2 Debye-Huckel Theory; 1.4 Solution Properties; 1.5 Flexibility; 1.5.1 The Concept of Persistence Length; 1.5.2 Interactions and the Separation of Length Scales; 1.5.3 Polyelectrolyte Behavior: Electrostatic Persistence Length; 1.5.4 DNA Persistence Length; References 2 Solution Behavior of Nucleic Acids2.1 Biological Function of Nucleic Acids; 2.2 Discovery of DNA; 2.3 Structure of Nucleic Acids; 2.3.1 DNA; 2.3.2 RNA; 2.3.3 Analogues of Nucleic Acids; 2.4 Nuclei Acids Nanostructures; 2.4.1 DNA; 2.4.2 RNA; 2.5 Behavior of DNA in Solution; 2.5.1 Ionization Equilibrium; 2.5.2 Flexibility of Nucleic Acids; 2.6 Melting of Double-Stranded DNA; 2.6.1 Effect of Base Composition; 2.6.2 Effect of Ionic Strength; 2.6.3 Effect of pH; 2.6.4 Dependence on

DNA Chain Length; 2.6.5 Dependence on DNA Concentration; Acknowledgments; References
3 Single DNA Molecules: Compaction and Decompaction3.1 Introduction; 3.2 Condensation and Compaction of DNA by Surfactants; 3.2.1 Linear DNA Condensation/Compaction by Positively Charged Surfactants; 3.2.2 Compaction of Plasmid DNA with Surfactants; 3.2.3 Non-ionic Surfactants; 3.2.4 Zwitterionic Surfactants; 3.2.5 Decompaction of DNA-Surfactant Complex; 3.3 DNA Condensation by Cationic Liposomes; 3.4 DNA Compaction and Decompaction by Multivalent Cations; 3.5 DNA Compaction by Polycations; 3.6 Compaction of DNA in a Crowded Environment of Neutral Polymer; 3.7 Conclusion; References
4 Interaction of DNA with Surfactants in Solution4.1 Introduction; 4.1.1 Surfactants; 4.1.2 Polymer-Surfactant Interactions; 4.1.3 Polyelectrolyte-Oppositely Charged Surfactant Interactions; 4.1.4 DNA-Surfactant Interactions; 4.2 DNA-Cationic Surfactant Interactions; 4.2.1 Solution Behavior; 4.2.2 Effect of the Surfactant Chain Length; 4.2.3 Effect of the Surfactant Head-group; 4.2.4 Structure of DNA-Surfactant Complexes; 4.2.5 DNA Is an Amphiphilic Polyelectrolyte; 4.3 DNA Covalent Gels and Their Interaction with Surfactants; 4.4 Applications; 4.4.1 Control of DNA Compaction/Decompaction
4.4.2 Purification4.4.3 Gene Transfection; Acknowledgments; References; 5 Interaction of DNA with Cationic Polymers; 5.1 Introduction; 5.2 Theory of DNA Interacting with Polycations; 5.2.1 Manning Condensation; 5.2.2 Counterion Release; 5.2.3 Short-Range Attractive Force due to Ion Correlations; 5.2.4 Phase Diagrams of Condensed DNA-Polycation Phases; 5.2.5 Finite-Size Aggregates; 5.3 Condensation of DNA, Phase Diagram, and Structure; 5.3.1 Short Polycations and Multivalent Cations; 5.3.2 Long Polycations and Basic Proteins; 5.4 Formation of Polycation-DNA Complexes: Polyplexes
5.5 DNA-Nanoparticles for Gene Delivery

Sommario/riassunto

A broad overview of the interaction of DNA with surfactants and polymers Due to the potential benefits of biotechnology, interest in the interaction between DNA and surfactants and polymers has become increasingly significant. Now, DNA Interactions with Polymers and Surfactants provides an extensive, up-to-date overview of the subject, giving readers a basis for understanding the factors leading to complexation between DNA and different cosolutes, including metal ions, polyelectrolytes, spermine, spermidine, surfactants and lipids, and proteins. Topical coverage includes:

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