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| Nota di contenuto | Preface; Contents; Chapter 1: The Basics of Translation; Chapter 2: Historical Milestones; Chapter 3: Methods of Studying Structure; 3.1 Low-Resolution Methods; Assembly; Surface Accessibility to Enzymes and Chemical Modifications; Proximity Information by Chemical Methods; Fluorescence Methods; Force Measurements; Electron Microscopy; Scattering Methods; Mass Spectrometry; 3.2 High-Resolution Methods; Cryo-EM; Nuclear Magnetic Resonance; X-Ray Diffraction; 3.3 Computational Methods; Chapter 4: The Message - mRNA; 4.1 The Genetic Code; 4.2 Transcription; 4.3 Processing of the Transcribed RNA 4.4 Translational Regulation, Reading Frame and Usage of the Genetic Code Chapter 5: The Adaptor - tRNA; 5.1 The tRNAs; 5.2 tRNA Structures; Primary and Secondary Structure; The 3D Structure; 5.3 Charging - the tRNA Synthetases; The Charging Reaction; Classes and Subclasses of Aminoacyl-tRNA Synthetases; 5.4 Recognition of Amino Acids and tRNAs by Aminoacyl-tRNA Synthetases; tRNA Recognition: Not a Simple Matter; Amino acid Recognition: An Old Mystery; The Structural Basis of Amino Acid Activation and Aminoacylation; 5.5 Deviations; Chapter 6: The Workbench - Ribosomes 6.1 The Composition of Ribosomes 6.2 rRNA; 6.3 Ribosomal Proteins; The Identification and Number of Ribosomal Proteins; The Copy Number of Ribosomal Proteins; 6.4 The Assembly of Ribosomes; Chapter 7: The Structure of the Ribosome; 7.1 Early Studies of the |

Structure of Ribosomal Subunits and Ribosomes; 7.2 Crystal Structures of Ribosomes; Some Steps in the History of Ribosome Crystallography; The Small Subunit; The Large Subunit; The 70S Ribosome; 7.3 The Inter-Subunit Bridges; B1; B2a; 7.4 The Structures of the Ribosomal RNA Molecules; 7.5 The Structures of Ribosomal Proteins Relationships between Ribosomal ProteinsProtein-RNA Interactions; Some Specific Proteins; S1; S4; S12; L1; L11; L10; L12; The P proteins; L16 (L10e); L22; L27; 7.6 The Structures of Eukaryotic and Mitochondrial Ribosomes; Chapter 8: Ribosomal Sites and Ribosomal States; 8.1 The Binding of mRNA; The Recognition of mRNA; The Binding Site for mRNA - The Decoding Site; 8.2 The tRNA Binding Sites; The T Site; The A Site; The P Site; The E site; Hybrid tRNA States; 8.3 The Peptidyl Transfer Center; 8.4 The Polypeptide Exit Tunnel; 8.5 The GTPase Binding Site; 8.6 The Ribosomal States Free Subunits and Translating Ribosomes, InitiationThe Pre- and Posttranslocation States; The MSI and MSII States; The Locked and Unlocked States; The Restrictive and Ram States; Color Plates; Chapter 9: The Catalysts - Translation Factors; 9.1 The trGTPases; The Consensus Elements, Nucleotide and Mg²⁺-Binding; Ribosome Binding; The 'Fly Trap'; What trGTPase Should Bind?; Binding Conformation of trGTPases; The Induction of GTP Hydrolysis - The Ribosomal GAP; The GTPase-Activating Region; GTP Hydrolysis by trGTPases; 9.2 Initiation Factors; IF1; IF2; IF3; EF-P; 9.3 Elongation Factors; EF-Tu Structure

Sommario/riassunto

This highly illustrated book provides an up-to-date description of the structure and function of the translation system including ribosomes, tRNAs, translation factors, antibiotics and aminoacyl-tRNA synthetases. Research on translation is undergoing rapid changes and is receiving significant attention as evidenced by the Nobel Prize in Chemistry 2009. The structural research by crystallography and cryo-EM forms part of an interactive framework that involves biochemistry and molecular computation. The book provides a comprehensive overview of translation in light of the structural results. It i
