Record Nr. UNINA9910877859503321 Protein synthesis and ribosome structure: translating the genome // **Titolo** edited by Knud H. Nierhaus and Daniel N. Wilson Pubbl/distr/stampa Weinheim,: Wiley-VCH, c2004 **ISBN** 1-280-55981-0 9786610559817 3-527-60343-3 3-527-61638-1 Descrizione fisica 1 online resource (599 p.) Altri autori (Persone) NierhausKnud H WilsonDaniel N Disciplina 572/.645 Soggetti Ribosomes Ribosomes - Structure Proteins - Synthesis Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Note generali Description based upon print version of record. Nota di bibliografia Includes bibliographical references and index. Nota di contenuto Protein Synthesis and Ribosome Structure; Contents; Preface; 1 A History of Protein Biosynthesis and Ribosome Research; 1.1 Introduction; 1.2 The Archaeology of Protein Synthesis - The 1940s: Forgotten Paradigms: 1.3 Basic Mechanisms - The 1950s: 1.3.1 Steps toward an in vitro Protein Synthesis System; 1.3.2 Amino Acid Activation and the Emergence of Soluble RNA; 1.3.3 From Microsomes to Ribosomes; 1.3.4 Models; 1.4 The Golden Age of Translation - The 1960s; 1.4.1 From Enzymatic Adaptation to Gene Regulation: Messenger RNA 1.4.2 A Bacterial in vitro System of Protein Synthesis and the Cracking of the Genetic Code1.4.3 The Functional Dissection of Translation; 1.4.4 The Structural Dissection of the Ribosome; 1.5 1970-1990s: A Brief Synopsis; References; 2 Structure of the Ribosome; 2.1 General Features of the Ribosome and Ribosomal Subunits; 2.2 A Special Feature of the 50S Subunit: The Tunnel: 2.3 Features of the Ribosomal Subunits at Atomic Resolution; 2.4 The Domain Structure of the

Ribosomal Subunits

2.5 Interactions of RNA with RNA or Struts and Bolts in the Threedimensional Fold of rRNA: Coaxial Stacking and A-minor Motifs2.5.1 Coaxial Stacking; 2.5.2 A-minor Motifs; 2.5.3 Ribose Zippers and Patches of A-minor Motifs; 2.5.3.1 Canonical Ribose Zipper; 2.5.3.2 Single-base Ribose Zipper; 2.6 Progress and New Developments in Understanding rRNA Structures; 2.6.1 K-turn; 2.6.2 Lonepair Triloop; 2.6.2.1 Classification of Lonepair Triloops; 2.6.3 Systemizing Base Pairs; 2.6.4 Systemizing RNA Structural Elements; 2.7 RNA-protein Interactions: 2.7.1 Problem of RNA Recognition 2.7.2 Chemistry of RNA-protein Interactions 2.7.3 rRNA-protein Interaction; References; 3 Ribosome Assembly; 3.1 Assembly Of The Prokaryotic Ribosome; 3.1.1 Introduction; 3.1.2 Processing of rRNAs; 3.1.3 Precursor Particles and Reconstitution Intermediates; 3.1.4 Assembly-initiator Proteins; 3.1.5 Proteins Essential for the Early Assembly: The Assembly Gradient; 3.1.6 Late-assembly Components: 3.1.7 Proteins Solely Involved in Assembly: 3.1.8 Assembly Maps: References; 3.2 Eukaryotic Ribosome Synthesis; 3.2.1 Introduction; 3.1.1 Prelude; 3.2.2 Why so many RRPs? 3.2.3 (Pre-)ribosome Assembly, the Proteomic Era3.2.4 Ribosomal RNA Processing, Getting there...; 3.2.5 Ribosomal RNA Modification: A Solved Issue?: 3.2.5.1 Ribose Methylation, Pseudouridines formation and the snoRNAs; 3.2.5.2 The Emergence of the snoRNAs; 3.2.5.3 Nonribosomal RNA Substrates for the snoRNAs; 3.2.5.4 Possible function(s) of RNA modifications; 3.2.5.5 Base methylation; 3.2.5.6 U3 snoRNP, the 'SSU Processome', and the Central Pseudoknot; 3.2.6 SnoRNA Synthesis and Intranuclear Trafficking; 3.2.6.1 SnoRNAs Synthesis 3.2.6.2 Non-core snoRNP Proteins required for snoRNA Accumulation

## Sommario/riassunto

Knud Nierhaus, who has studied the ribosome for more than 30 years, has assembled here the combined efforts of several scientific disciplines into a uniform picture of the largest enzyme complex found in living cells, finally resolving many decades-old questions in molecular biology. In so doing he considers virtually all aspects of ribosome structure and function -- from the molecular mechanism of different ribosomal ribozyme activities to their selective inhibition by antibiotics, from assembly of the core particle to the regulation of ribosome component synthesis. The result is a premier