Claude Helene, Ph.D.

Professor and Chair of Biophysics
Museum National d'Histoire Naturelle
Laboratory of Biophysics
INSERM U201, CNRS UMR 8646
43 Rue Cuvier
75005 Paris
France

Claude Helene is Professor, Chair of Biophysics, at the National Museum of Natural History in Paris where he is head of an INSERM research unit. From 1974 to 1982 he was Director of the CNRS Institute of Molecular Biophysics in Orleans. From 1990 to 1999 he was Scientific Director of Rhône-Poulenc. His work is devoted to the development of new strategies for sequence-specific control of gene expression and their therapeutical applications.

Sequence-Specific Gene Targeting Using Triplex Strategies

Specific sequences of double-helical DNA can be recognized by oligonucleotides that form triple-helical complexes. A gene-specific pharmacological approach can be used whereby a synthetic oligonucleotide or an oligonucleotide analogue can be designed to selectively control the transcription of the targeted gene[1]. The oligonucleotide can be covalently attached to a molecule that can either induce an irreversible damage in the DNA (e.g., psoralen)[2] or recruit a cellular enzyme to effect a site-specific modification of the target (e.g., cleavage by topoisomerase I)[3]. Alternatively, a gene therapy protocol can be developed whereby a DNA construct is used to generate a triplex-forming RNA within cells[4,5]. Another strategy based on clamp oligonucleotides[6] allowed us to design oligonucleotide sequences that can bind to and form triple-helical complexes with specific targets on a single-stranded nucleic acid, (e.g., viral RNA) and inhibit nucleic acid-processing enzymes (e.g., reverse transcriptase).

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