Stanford



Roger Kornberg

Mrs. George A. Winzer Professor of Medicine

Structural Biology

Bio

ACADEMIC APPOINTMENTS

- Professor, Structural Biology
- Member, Bio-X
- Member, Wu Tsai Neurosciences Institute

LINKS

- Nobel Prize Press Coverage: http://mednews.stanford.edu/releases/2006/october/kornberg.html

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our goal is to elucidate the fundamental basis of gene regulation. We study the control of transcription, the first step in the pathway of gene expression. Current work focuses on discovery of the molecular machines involved in transcription, reconstitution of the process with purified components, structure determination of the transcription machinery, and structure-function relationships in chromatin, the natural DNA template for transcription.

Highlights of work from the past three years include:

1. Discovery of a human homolog of the 20-protein yeast Mediator complex. Mediator is the central processing unit of gene regulation, receiving both positive and negative inputs and transducing the information to the transcription machinery.

2. Structure determination of 10-subunit, half million Dalton RNA polymerase II, in the act of transcription, with template DNA and protduct RNA, by X-ray crystallography at atomic resolution.

3. Structure determination of the entire transcription initiation complex by two-dimensional protein crystallography.

4. Discovery of a stably altered nucleosome produced by a purified chromatin-remodeling complex.

Current work is directed towards the structure of the entire transcription apparatus at atomic resolution and the mechanism of transcription control in living cells.

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Jingchang Liang

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Biophysics (PhD Program)
- Structural Biology (PhD Program)

Publications

PUBLICATIONS

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- **Cryo-EM structure of Nipah virus RNA polymerase complex.** *Science advances*
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- **The Determination of Free Energy of Hydration of Water Ions from First Principles.** *Journal of chemical theory and computation*
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