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## Prelog Lecture 1998

Prof. Dr. Lia Addadi  
 The Weizmann Institute of Science, Rehovot, Israel



Foto: R. Häfliger

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L. Addadi

Lia Addadi was born in 1950 and raised in Padua, Italy. Her interest in chemistry developed at the Università degli Studi di Padova, where she studied from 1968 to 1973. She subsequently transferred to the Weizmann Institute of Science in Rehovot, Israel, for doctoral work and received a Ph.D. in structural chemistry in 1979 under the direction of Meir Lahav for studies on the synthesis of chiral polymers by reactions in chiral crystals. After a post-doctoral stay with J.R. Knowles at Harvard University, Dr. Addadi returned to the Weizmann Institute and became Associate Professor in 1988. She rose quickly through the ranks, becoming Full Professor in 1993 and head of the Department of Structural Biology in 1994.

Molecular recognition of ordered crystal arrays provides the unifying theme of Dr. Addadi's scientific program. Living organisms use minerals for many purposes, the construction of stable skeletal structures being perhaps only the most familiar, and they have evolved sophisticated strategies for controlling the process of mineralization. Over the past decade, Dr.

Addadi has contributed significantly to our knowledge of the structures of mineralized tissues and the mechanisms by which they are produced. For example, she and her colleagues have explored the structural and stereochemical relationships between acidic proteins and calcite, carbonated apatite, and other biominerals, showing how biological macromolecules nucleate oriented crystal growth and alter crystal morphology through interactions with specific surfaces. In structural studies of natural crystal-protein composites it was found that protein intercalation into the crystal lattice can subtly alter a material's texture and mechanical properties, making these features amenable to biological control.

Her demonstration that immunoglobulins and serum albumins selectively adhere to crystal surfaces and nucleate crystal formation has provided fresh insight into diseases like gout and osteoarthritis that involve formation of unwanted crystals in bodily fluids, as has her discovery that crystals can serve as conventional antigens to elicit the production of anti-

bodies which bear the imprint of distinct crystal surfaces and behave as nucleation catalysts. The observation that whole cells similarly distinguish different faces of a given crystal – and even the corresponding faces of enantiomorphous crystals – makes possible the systematic investigation of the molecular recognition events that govern cell adhesion, a fundamental process affecting the structure and behavior of cells.

Dr. Addadi's work innovatively combines the tools of structural biology with those of organic, inorganic and analytical chemistry. In its originality and depth it has had a profound impact on the way we think about molecular recognition at crystal interfaces. Her efforts to elucidate the principles underlying controlled mineralization are fundamental in nature, providing mechanistic information not readily available from studies with conventional heterogeneous surfaces. They also have important practical implications for the fabrication of new and improved synthetic materials and for understanding and influencing biology at interfaces.

Lia Addadi has been widely recognized for her pioneering work. Among other major awards, she has received the Ernst David Bergmann Prize in Chemistry (1986), the Annual Award of the Israel Chemical Society (1989), and the NIDR prize for distinguished scientists (1996). The Laboratorium für Organische Chemie is honored to add her name to the roster of distinguished Prelog medalists.

Former Prelog Lecturers

- 1986 Kurt Mislow
- 1987 Meir Lahav und Leslie Leiserowitz
- 1988 K. Barry Sharpless
- 1989 Jeremy R. Knowles
- 1990 Henri B. Kagan
- 1991 Clayton H. Heathcock
- 1992 J. Michael McBride
- 1993 Hisashi Yamamoto
- 1994 Jean-Pierre Sauvage
- 1995 Yoshito Kishi
- 1996 David M.J. Lilley
- 1997 Günter Helmchen