

MECHANICAL ENGINEERING DEPARTMENT  
ME/ISYE 8773-8774

*Life Without Water (Anhydrobiosis): Organisms,  
Mechanisms, Significance*  
by

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Wednesday, September 5, 2007  
3:30 p.m.

Room 1130 Mechanical Engineering

Refreshments will be available at 3:15 p.m. in Room 1130 ME before the seminar

**ABSTRACT** — Water is essential for life – or is it? Most organisms die if major reductions in their water content occur. But a significant number have achieved, through their evolution, the ability to lose essentially all cell & tissue water in a reversible fashion (anhydrobiosis). Much attention has been given to the adaptive mechanisms that enable desiccation tolerance, studied chiefly at the cellular and molecular levels. I will consider these mechanisms, some of which involve a special class of proteins (referred to as LEA), the formation of sugar/protein glasses (vitrification) and the replacement of structural water on membranes and macromolecules by sugars such as trehalose and sucrose. The biological significance of anhydrobiosis will be considered, including applications of basic research aimed at conferring dehydration-tolerance on non-adapted systems, including mammalian cells. Antony van Leeuwenhoek discovered anhydrobiosis in 1702; perhaps my seminar is a sort of progress report.

**BIO** — Jim Clegg received his BS degree from Penn State University and PhD from the Johns Hopkins University (1961). After a year postdoc at Hopkins he joined the faculty of the University of Miami where he became professor of biology in 1970, and professor of anatomy and cell biology in 1983 (School of Medicine). In 1985 he was appointed to the faculty of the University of California, Davis, as director of the Bodega Marine Laboratory (through 1998) and currently in the Section of Molecular and Cellular Biology, UC Davis. Clegg has been visiting scientist at Oak Ridge National Laboratory, the CNRS at Thiais (Paris), University College of Wales, and as a Fulbright Senior Research Fellow at the University of London (1978) and at Ghent University, Belgium (1999). His current research involves biochemical and biophysical adaptations associated with resistance of invertebrates to environmental extremes, notably studying stress proteins and molecular chaperones. He has also worked extensively on the nature of cytoplasmic organization in cultured mammalian cells and on the properties of cell water. He is a Fellow of the AAAS, the author/co-author of over 135 journal articles, and has co-edited 5 books.

Informal Faculty Luncheon: Wednesday, September 5, 2007, 12:00 noon. Meet in 1100 ME and walk to lunch with other faculty. Prof. James Clegg will be able to attend.