Reply

Reply to the comment on the Hypothesis: Origin of globular structure in proteins

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The main question considered is: how do proteins avoid immiscibility, typical of polymers. According to the hypothesis proposed in the paper, the unusually high miscibility (cosolubility) of proteins with each other and with other biopolymers is due to a 'molecular mimicry', i.e. formation of a compact globule, with the chemical information hidden in the interior. This results in chemically similar surfaces and a smaller volume of molecules. The other ideas of the paper are: (i) the globular structure of proteins has evolved to provide miscibility and biochemical efficiency of proteins; (ii) incompatibility of biopolymers could serve to control their thermodynamic activity; (iii) phase separation of biopolymer mixtures might be the mechanism for collective transport of protein molecules newly produced in the cell, for natural selection of macromolecules for non-specific immune defence, for digestion and for storage of proteins in the cell.

Professor P. Jollès is absolutely right that half of the references are to works by the author. There are two reasons for this. First, the paper is strictly limited in length and second, all published phase diagrams, and indeed most data in the field of thermodynamic compatibility of proteins are from the author's laboratory.

There is some misunderstanding with Professor P. Jollès' point concerning caseins. In fact this paper is not an experimental study. It is not devoted to casein or other individual proteins. Its objective is to consider general structural aspects of the compatibility of globular proteins in mixed solutions. I doubt that additional experimental data concerning caseins would help the understanding of the subject. However, the references given contain all experimental details.

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