



Comparison of Amino Acids Physico-Chemical Properties and Usage of Late Embryogenesis Abundant Proteins, Hydrophilins and WHy Domain

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Late Embryogenesis Abundant proteins (LEAPs) comprise several diverse protein families and are mostly involved in stress tolerance. Most of LEAPs are intrinsically disordered and thus poorly functionally characterized. LEAPs have been classified and a large number of their physico-chemical properties have been statistically analyzed. LEAPs were previously proposed to be a subset of a very wide family of proteins called hydrophilins, while a domain called WHy (Water stress and Hypersensitive response) was found in LEAP class 8 (according to our previous classification). Since little is known about hydrophilins and WHy domain, the cross-analysis of their amino acids physico-chemical properties and amino acids usage together with those of LEAPs helps to describe some of their structural features and to make hypothesis about their function. Physico-chemical properties of hydrophilins and WHy domain strongly suggest their role in dehydration tolerance, probably by interacting with water and small polar molecules. The computational analysis reveals that LEAP class 8 and hydrophilins are distinct protein families and that not all LEAPs are a protein subset of hydrophilins family as proposed earlier. Hydrophilins seem related to LEAP class 2 (also called dehydrins) and to Heat Shock Proteins 12 (HSP12). Hydrophilins are likely unstructured proteins while WHy domain is structured. LEAP class 2, hydrophilins and WHy domain are thus proposed to share a common physiological role by interacting with water or other polar/charged small molecules, hence contributing to dehydration tolerance.

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- [1] <http://okina.univ-angers.fr/e.jaspard/publications>
- [2] <http://okina.univ-angers.fr/gilles.hunault/publications>
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