

Breaking down the Hourglass: The Myriad Roles of Nodulin-like Intrinsic Proteins in Plant Nutrition and Stress Responses"

"Plant colonization of the land was accompanied by the diversification of the aquaporin superfamily of water and nutrient transport channels with all higher plant lineages possessing at least three times the number of aquaporin superfamily genes compared to their microbial and animal counterparts. This gene amplification was accompanied by the diversification of the biochemical and physiological functions of these proteins beyond their conventional role as water-specific transporters. In this seminar the myriad functions associated with Nodulin Intrinsic Proteins (NIPs), a plant specific subfamily of the aquaporin superfamily, will be discussed. We will first explore the seminal discovery and function of the nodulin 26 NIP as a specific channel for ammonia and water associated with legume-rhizobia symbiosis and nitrogen fixation and assimilation. A broader examination of the function of NIPs as critical channel proteins involved in multiple stress responses and plant nutrition in all plant species will also be evaluated. The structural alterations that occurred during evolution that lead to these specific roles will also be presented."