Phillips Hydrocolloides Research Ltd. (PHRLtd) and San-Ei Gen F.F.I., Inc. International Hydrocolloids Forum Part I

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Summary

The International Forum is one of the instruments of the International Cooperation for Global Innovation programme being implemented jointly by Phillips Hydrocolloids Research Ltd. (PHRLtd) and San-El Gen F.F.I., Inc. to explore the boundaries of scientific areas related to our commercial interests. There is great excitement in exploring interdisciplinary subjects, and the Arabinogalactan Proteins (AGPs) represent one such area.

They are a large family of glycoprotein found in plants membranes, cell walls and plant secretions, and are ubiquitous throughout the plant kingdom. The Forum was planned to bring together experts in the various aspects of these fascinating materials, which span all the way from controlling plant development to providing important industrial commodities and technical products. Chemical botanists, plant biologists, genetic manipulators, medical doctors, cell biologists and microbiologists have joined chemical and industrial research scientists in the quest to understand these incredibly diverse yet related materials. The two editions of the Journal are the result. The first edition here concentrates on the origin, composition and function within the biological world.

The question is what are the AGPs in composition and in structure and how do they relate to one another? Although not living themselves, they have a role in providing instructions to cells and through their glycosylphosphosphatidylinositol (GPI) anchor provide communication between plants and their environment. There is an indication too that they might be able to serve as agents to strengthen the human immune system. Professor Bacic opens the curtain on this fascinating class of plant glycoproteins which are becoming increasingly important in plant biology and human health.

Professor Paul Knox takes this fascinating story a stage further. Can these strategic molecules enable us to understand the growth and development of plants at the molecular level? To make progress in this direction it is necessary to understand the genetic codes within the various AGP sequences. Professor Knox cleverly uses monoclonal antibodies to explore the parts and functions of strategic epitopes.

Professor Kieliszewski uses modern synthetic gene technology to design novel glycoproteins, and AGPs, whose properties could resemble the native AGPS. She is able to define many of the structural sequences, particularly the peptide modules which make up the AGPS.

Dr Redgwell shows us that the AGPs are present in several varieties of both Arabica and Robusta coffee, and it is likely that they have diverse functions during the growth and development of coffee. This observation opens up new and exciting physiochemical possibilities for their use as surface active hydrocolloids. As in all investigative studies analytical tools are vital and Professor John Williams, Neil Pickles and Professor Paul Knox demonstrate the power of monoclonal antibodies in the regard.

Thereafter, there is a transition to the microbiological, medical and chemical fields. Coming from plant world AGPs offer a valuable source of dietary fibre. Professor Ushida shows that these remnants and products of plant wails are not metabolized in the stomach but ferment in the colon to give short chain fatty acids which are beneficial to human health. Moreover, Professor Ushida's work demonstrates also that the AGP in the special Acacia gum produced by San-El Gen F.F.I., Inc. acts as a prebiotic and stimulates the production of beneficial bacterial in the colon. Professor Aled Phillips and his colleagues in Japan have shown that the effects of dietary supplementation with this material can prove beneficial to humans. With 25 grams per day there is a two-fold increase in serum butyrate which has been shown to play a role against colo-rectal cancer and inflammatory bowel disease. The research shows that increasing systemic levels of butyrate could have a potential beneficial effect in renal diseases by suppression of TGF-β activity.

What a scope these materials span!