

Special Lecture

Next Generation Food Biotechnology for Management of Human Diseases

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SUMMARY: The combination of immuno-deficiency, inflammatory process and nutritional status that is characteristic of infective and food-borne illness is more evident in chronic diet- and environment-influenced chronic diseases such as diabetes, obesity, cardiovascular disease, cancer, arthritis and neuro-degeneration diseases. These chronic diseases tend to be oxidation-linked and may manifest in communities around the world, irrespective of income. In addressing the challenges of the above diseases, a significant role for dietary phytochemicals is emerging. Phytochemicals are required from a spectrum of food for at least their antioxidant role, if not for other properties, to protect tissues from activities that manifest themselves into what we call chronic disease. Among the diverse groups of phytochemicals, phenolic antioxidants and antimicrobials from food plants are being targeted for designed dietary intervention to manage major oxidation-linked diseases such as diabetes, cardiovascular diseases, arthritis, cognition diseases and cancer. Foods containing phenolic phytochemicals are also being targeted to manage bacterial infections associated with chronic diseases such as peptic ulcer, urinary tract infections, dental caries and food-borne bacterial infections. Important Biotechnology strategies to develop dietary phenolic phytochemicals for Functional Foods to manage oxidation and infectious diseases will be presented. The biochemical strategy for harnessing phenolic phytochemicals for human health and wellness is based on the hypothesis that phenolic metabolites in plants are efficiently produced through an alternative mode of metabolism linking proline synthesis with pentose-phosphate pathway. The proposed proline-linked pentose-phosphate pathway model provides a mechanism for understanding the mode of action of phenolic phytochemicals in modulating antioxidant pathways and provides avenues by which dietary approaches may manage oxidation-linked chronic and infectious diseases. Further this model also has relevance for environmental bioremediation using plant and microbial systems, as well as for improving agricultural and food systems in harsh environments.

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Conference room 1 (Administration Bldg. 2F)

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