Editorial

Lipids in health and disease

The research articles published in this online-issue of *Molecular Nutrition & Food Research* can loosely be grouped into two themes. The first group of articles provides answers to the question of how dietary non-lipid molecules trigger responses in the physiology and pathophysiology of lipid metabolism (with one "outlier" investigating the role of dietary oxysterols). And the second group of articles interrogates the role of dietary lipids on human physiology, especially addressing issues such as metabolic syndrome and insulin resistance as well as inflammatory responses and tissue damage.

> *"how dietary non-lipid molecules trigger responses in the physiology and pathophysiology of lipid metabolism" .... "role of dietary lipids on human physiology",...*

Of course, there is substantial cross-over between the two categories. The first three articles investigated how non-lipid molecules achieve their lipid-lowering effects. Rideout and co-workers provide convincing evidence on the positive effects of dietary plant sterols in lowering plasma triglyceride levels from a 6-week study in mice fed a Western diet, an effect that may be mediated by a combination of increased fecal loss of fatty acids and decreased weight gain. The article by Qin *et al.* reports on the anti-inflammatory and lipid regulatory effects of green tea polyphenols focusing on the cardiac muscle in a model of insulin-resistant rats. Pea proteins, studied by Rigamonti *et al.*, showed marked cholesterol and triglyceride lowering activity in rats. In this case, the lipid-lowering effect was likely due to regulation of genes involved in hepatic cholesterol uptake and fatty acid synthesis.

Oxidized modification of LDL and its incorporation into macrophages is a major hallmark in the development of atherosclerotic lesions. Leonarduzzi and co-workers investigated the signaling pathways by which food-borne oxidized derivatives of cholesterol ("oxysterols") induce expression of the macrophage scavenger receptor for oxidized LDL, CD36, and thus promote atherogenesis. In contrast, the garlic ingredients diallyl disulfide and diallyl trisulfide are shown to protect endothelial cells from damage exerted by oxidized LDL (Lei *et al.*). A different kind of damaging effect resulting from a high-fat diet is dysfunction of the skin as detailed in the article by Yamane and co-workers.

The next three articles continue the thread of inflammation and tissue damage while focusing on the protective effects dietary lipids. Contrary to their starting hypothesis, Knoch and coworkers found that, using an animal model of inflammatory bowel disease, dietary arachidonic acid did not exhibit pro-inflammatory properties but instead was protective against oxidative stress in colonocytes. Razquin and co-workers, as part of the PREDIMED clinical trial, investigated the association of a polymorphism in the IL-6 promoter and adiposity and provide data that the Mediterranean diet, exemplified by the consumption of virgin olive oil, reduced body weight gain depending on the IL-6 genotype. Zhang *et al.* investigated the anti-inflammatory properties of pistachio oil and identified "interferon-induced protein with tetratricopeptide repeats 2" (Ifit-2) in an array approach using LPS-activated RAW264.7 macrophages. The authors suggest that Ifit-2 could potentially be developed into a nutrition-sensitive biomarker of inflammation.

The last three articles in this issue address the role of fatty acids in peptide hormone secretion. Hand and coworkers identified conjugated linoleic acid as potent secretagogue for cholecystokinin, and finally, the role of ω-3 fatty acids in insulin signaling is described during adipocyte differentiation (Lorente-Cebrian *et al.*) and in type-2 diabetes in a Chinese cohort (Huang *et al.*).

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