Western diet and acne

Dietary intervention in acne: Attenuation of increased mTORC1 signaling promoted by Western diet.

The purpose of this paper is to highlight the endocrine signaling of Western diet, a fundamental environmental factor involved in the pathogenesis of epidemic acne. Western nutrition is characterized by high calorie uptake, high glycemic load, high fat and meat intake, as well as increased consumption of insulin- and IGF-1-level elevating dairy proteins. Metabolic signals of Western diet are sensed by the nutrient-sensitive kinase, mammalian target of rapamycin complex 1 (mTORC1), which integrates signals of cellular energy, growth factors (insulin, IGF-1) and protein-derived signals, predominantly leucine, provided in high amounts by milk proteins and meat. mTORC1 activates SREBP, the master transcription factor of lipogenesis. Leucine stimulates mTORC1-SREBP signaling and leucine is directly converted by sebocytes into fatty acids and sterols for sebaceous lipid synthesis. Over-activated mTORC1 increases androgen hormone secretion and most likely amplifies androgen-driven mTORC1 signaling of sebaceous follicles. Testosterone directly activates mTORC1. Future research should investigate the effects of isotretinoin on sebocyte mTORC1 activity. It is conceivable that isotretinoin may downregulate mTORC1 in sebocytes by upregulation of nuclear levels of FoxO1. **The role of Western diet in acne can only be fully appreciated when all stimulatory inputs for maximal mTORC1 activation, i.e., glucose, insulin, IGF-1 and leucine, are adequately considered. Epidemic acne has to be recognized as an mTORC1-driven disease of civilization like obesity, type 2 diabetes, cancer and neurodegenerative diseases.** These new insights into Western diet-mediated mTORC1-hyperactivity provide a rational basis for dietary intervention in acne by attenuating mTORC1 signaling by reducing (1) total energy intake, (2) hyperglycemic carbohydrates, (3) insulinotropic dairy proteins and (4) leucine-rich meat and dairy proteins. The necessary dietary changes are opposed to the evolution of industrialized food and fast food distribution of Westernized countries. An attenuation of mTORC1 signaling is only possible by increasing the consumption of vegetables and fruit, the major components of vegan or Paleolithic diets. The dermatologist bears a tremendous responsibility for his young acne patients who should be advised to modify their dietary habits in order to reduce activating stimuli of mTORC1, not only to improve acne but to prevent the harmful and expensive march to other mTORC1-related chronic diseases later in life.