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## Preclinical studies on the effects of *Moringa oleifera* on lipid metabolism

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Lipid metabolism disorders are associated with the increase in concentrations of blood lipids such as cholesterol, LDL and triglycerides leading to cardiovascular diseases. Plant-based medicinal agents offer an alternative therapeutic approach to prevent and treat these disorders. Our research group has explored the potential role of *Moringa oleifera* (MO), an Indian traditional medicinal plant on various aspects of lipid metabolism using preclinical approaches. Preclinical studies included ability to bind bile acids, inhibitory effects on HMG-CoA enzyme and animal studies on serum lipid levels and HMG-CoA activity in rats fed high-fat diets. In addition, antioxidant activity in food and biological systems, pH and thermal stability of the plant extracts was also investigated. *Ex vivo* studies revealed that MO polyphenols (MOP) were effective in modulating the cholesterol metabolism by inhibiting HMG-CoA reductase, the rate limiting enzyme in cholesterol synthesis. Combination of dietary fats and MO that leaves as a source of vitamin E was beneficial in reducing plasma cholesterol and lipid peroxidation in rats. In rats, feeding high-fat diet, administration of MOP rich extract significantly lowered the serum cholesterol, triglycerides and low-density lipoprotein cholesterol by inhibiting HMG-CoA reductase activity and promoting fecal excretion of cholesterol metabolites. Aqueous extract of MO significantly inhibited *in vitro* platelet aggregation induced by agonists by inhibiting cyclooxygenase pathway of arachidonic acid metabolism. Compared to synthetic antioxidants, MO extracts showed high antioxidant activity as studied by antioxidant assays. MO exhibited potent antioxidant activity in lipid systems with FeSO<sub>4</sub>-induced oxidation. In food systems, viz. biscuits and fruit juice, MO was effective in controlling lipid oxidation during storage, due to the presence of phenolic compounds. Heat processing and storage did not affect the stability of antioxidant vitamins. Extracts showed high thermal stability of antioxidant components and antioxidant potential in inhibiting peroxidation in lipid substrates. The findings lend support to the hypocholesterolemic role of *Moringa oleifera* leaves, hence can be promoted as a natural nutraceutical source and functional food owing to the presence of saponins, polyphenols and fiber contributing to the lipid lowering mechanism.

## Physical observation for nutritional deficiencies

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Learning how to observe physical features can help one determine nutritional deficiency patterns and health needs prior to disease occurring. This information is imperative in today's health care and in the "sub-clinical" patient, before disease progresses to outright symptoms and blood changes. Traditional doctors used physical observations of our body to confirm our health issues. They did not and could not rely on testing or blood work. Physical observations enable one to take the guess work out of nutritional deficiencies and organ health patterns. This class insures a measurement of patient evaluation as a critical tool in the medical toolbox. If pre-and post-nutritional evaluations and sound patient observations are added, the practitioner can confirm the findings while creating a recordable and even visual benchmark for patients to see the change and progress. This approach heightens the practitioner's ability to identify root causes, target priorities, and integrate patient interaction, while improving understanding, retention and compliance. Using functional assessments of the digestive system, thyroid, adrenals, and more, the health and direction of care becomes more obvious to see, treat, and monitor. While correlating specific observations and testing procedures, one can determine organ health, utilization of nutritional factors, and what direction is best for the client. We will look at the tongue, face, nails, reflex points, simple office testing procedures and holistic care to determine how to help our patients through physical observations for nutritional deficiencies.