Role of Functional/ Bioactive Compounds in Health Promotion

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Dietary Fibres

Dietary fibres are non-starchy polysaccharides and structural components of the cell walls of cereals and microorganisms.

1. **Water soluble dietary fibres**: β-glucans, gums, pectin, mucilage and arabinoxylans
2. **Water Insoluble dietary fibres**: lignin, cellulose, and hemicellulose

Functions:

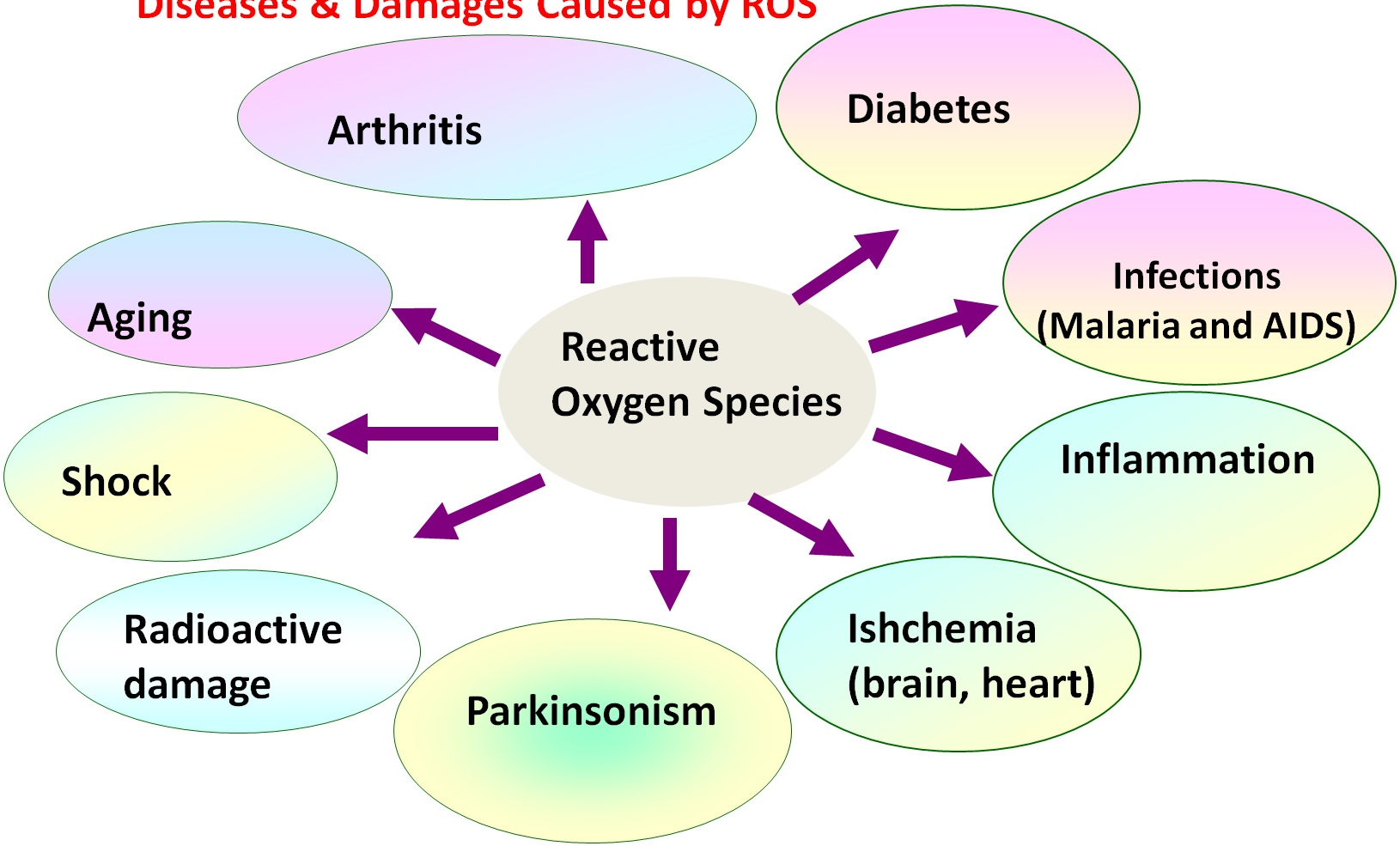
- Entrap harmful toxins and carcinogens in the digestive tract.
- Good water retention capacity, gelling ability and hydro-colloidal forming properties which have influenced their use as substitutes for fat
- Insoluble dietary fibre, can not dissolve in water and is effective in adding faecal bulk and increasing the rate of passage of food through the intestinal tract.

Antioxidants

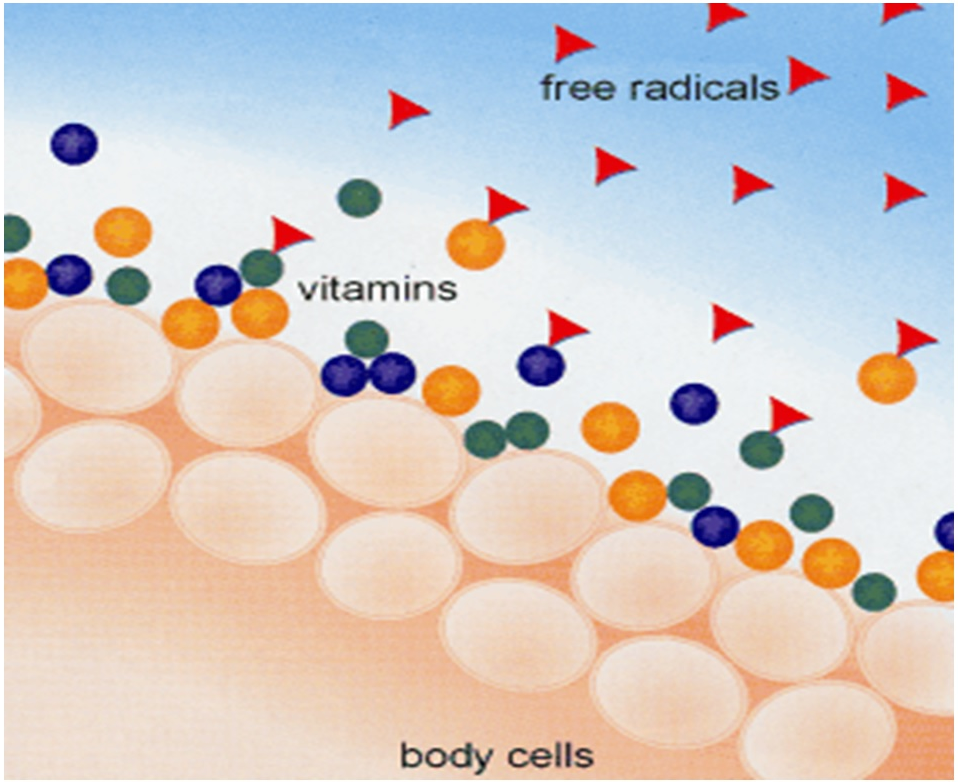
- Antioxidants are groups of compounds which neutralise free radicals and reactive oxygen species (ROS) in the cell.

- **Functions**: The primary functions of include the regulation of the redox potential within a cell and the reduction of potential initiators of cell death and carcinogenesis

Diseases & Damages Caused by ROS



Free Radical Damage



What does that damage look like?

Skin	Wrinkles
Joints	Arthritis
Arteries	Heart Disease
Brain	Alzheimer's
DNA	Cancer

Probiotics and prebiotics

- Probiotics are believed to protect us in two major ways.

1. The first is the role that they play in our digestive tract.
2. The second major benefit of probiotics is the impact they have on our immune system

Omega-3 Oils & Their Health Benefits

- Long-chain ω3 PUFA are of great interest because of their effectiveness in prevention and treatment of
- coronary heart disease
- hypertension
- diabetes
- arthritis and other inflammations
- Autoimmune disorders
- mental health and neural function as in depression
- Schizophrenia and cancers.
- They are essential for maintenance and development of normal growth, especially for the brain and retina.

Forms of omega-3 fatty acid/oil products

- Triacylglycerol (TAG) or TAG concentrate
- Ethyl ester (EE) or EE concentrate of eicosapentaenoic acid
- (EPA) and/or docosahexaenoic acid (DHA)
- Phospholipid
- Calcium and magnesium salts
- Chromium (III) – DHA complex
- Phytosterol-DHA ester
- Epigallocatechin gallate (EGCG) – DHA ester

Mechanisms of action of phenolic and polyphenolic compounds

- Direct Removal of ROS/RNS or potentiation of cellular
- Antioxidant capacity
- Affecting cell differentiation
- Increasing the activity of carcinogen detoxifying enzymes
- Blocking the formation of *N-nitrosamines*
- Altering the estrogen metabolism and/or colonic milieu
- Increasing apoptosis /death of cancerous cell and/or decreasing cell proliferation
- Affecting DNA methylation and/or maintaining DNA repair
- Preserving the integrity of intracellular matrices