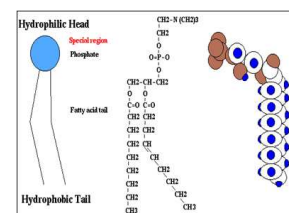
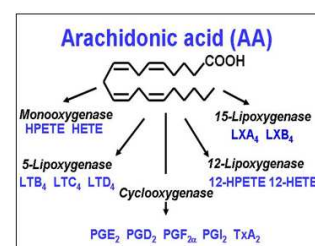


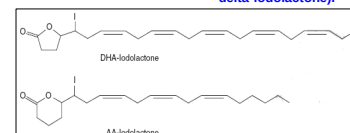
Phospholipids contain 2 fatty acids, one saturated and one unsaturated (shown by the double bond), linked to a glycerol.



"membrane lipid language" (Fig. 8)
Arachidonic Acid Pathway:
 Leukotriene, Prostaglandin, Thromboxane Synthesis



DHA - iodolactone (5-iodo-4-hydroxy-7,10,13,16,19-docosapentaenoic acid, **gamma-lactone**) and
AA - iodolactone (6-iodo-5-hydroxy-8,11,14-eicosatrienoic acid, **delta-lactone**).



Structure of some best known iodolipid molecules

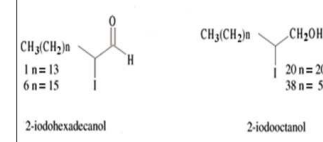


Fig. 3. Iodine in Evolution Over 3 billion years ago, in the primitive sea, blue-green algae were the first living prokaryotes to produce oxygen and halo-carbons (such as CH₃I) in the atmosphere, and also PUFAs in lipid membranes. About 500 Ma, when the primitive brain evolved in marine animals, thyroid cells originated from the primitive foregut in vertebrates, migrated and specialized in uptake and storage of iodo-compounds in a novel follicular "thyroidal" structure, as a reservoir for iodine. 350 Ma, some vertebrates evolved into amphibians and reptiles when they colonized the I-deficient land. In vertebrates, thyroid hormones became active in the metamorphosis and thermogenesis as an adaptation to the terrestrial environment (Venturi, 2000).

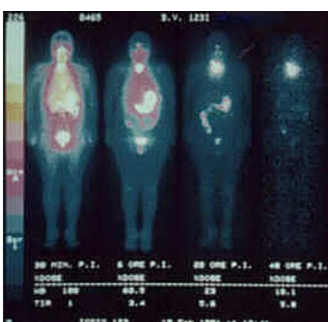
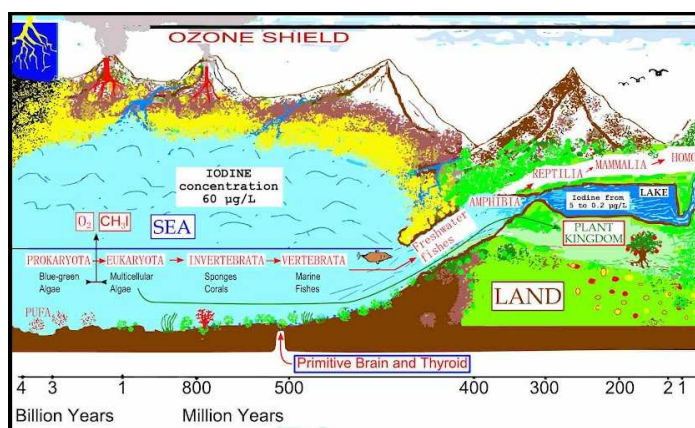
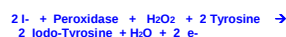


Figure 4, 5. Sequence of 123-iodide total-body scintiscans of a woman after intravenous injection of 123-iodide (half-life: 13 hours); (from left) respectively at 30 minutes, and at 6, 20 and 48 hours. The highest and rapid concentration of radio-iodide is evident in stomach, salivary glands, peri-encephalic liquor, choroid plexus and oral mucosa. In the thyroid, the iodide-concentration is more progressive, as in a reservoir [from 1% (after 30 minutes) to 5.8 % (after 48 hours) of the total injected dose].

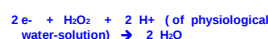
About 3.5 billion years ago (BYA) in the sea, primitive oxygenic and photosynthetic **algae**, the basis of the marine food chain, accumulated accumulated trace-elements such as **iodine** and **selenium** to protect the fragile **PUFAs** in their cell membranes against peroxidation. Fishes do not produce omega-3 fatty acids but only accumulate them by eating algae.

Antioxidant mechanism of iodides:
iodide acts as a primitive electron-donor, through peroxidase.

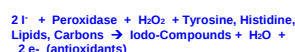
$$2 \text{I}^- \rightarrow \text{I}_2 + 2 \text{e}^- \text{ (electrons)} = -0.54 \text{ Volt}$$



and



and



Iodo-compounds: Iodo-tyrosine, Iodo-histidine, Iodo-lipids, Iodo-carbons

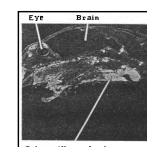
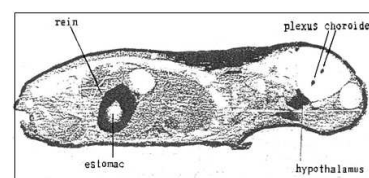
IODIDE is the most ancient and the most powerful natural **antioxidant** (4, 5).

Packer I. 2008 · Küpper E. et al. 2008 · Venturi S. 2011

In chemistry, the amount of unsaturation (double bonds) in PUFAs is called the **iodine value** or **iodine number**.



Contrary to the amphibian metamorphosis, **in mammals** and humans the thyroidectomy or iodine deficient **hypothyroidism** might be considered as a sort of metabolic and **phylogenetic regression** to our antecedent reptile stage. Indeed, many symptoms of the hypothyroid humans seem to be reptile-like: dry, hairless, scaly, cold skin with a general slowdown of metabolism, digestion, heart rate, nervous reflexes, lethargy and hypothermia (6).



Figs 6, 7. Distribution of 131-iodine (half-life: 8 days) in radioautographies of the body of rats after subcutaneous injection of radio-iodine. High I-concentration is evident in iodo-compounds and iodo-lipids of the choroid plexus, retina, hypothalamus, gastric mucosa and epidermis, where it is detectable up to 5 days after injection (courtesy of Path Biol 1961, and Acta Radiol Ther Phys Biolog 1964).

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