Chemistry

About 3.5 billion years ago (BYA) in the sea, primitive oxygenic and photosynthetic algae, the basis of the marine food chain, accumulated iodine and selenium as protective trace-elements of their fragile membrane PUFAs 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 peroxidation.

\[
2I^- \rightarrow I_2 + 2e^- \quad (electrons) \quad -0.54 \text{ Volt}
\]

and

\[
2I^- + H_2O \rightarrow IO^- + 2H^+ + e^- \quad (antioxidant)
\]

and

\[
2I^- + \text{H}_2\text{O} + \text{H}_2\text{O} \rightarrow \text{HOI} + 2e^- \quad (antioxidant)
\]

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

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

Iodide and T4 trigger the amphibian metamorphosis that transforms the larval tadpole into an adult carnivorous frog, with better neurological, visuospatial, olfactory, and cognitive abilities for hunting, as seen in other predatory animals. Similarly happens in the neotenic amphibian salamander, which without introducing iodine, does not transform in terrestrial adult and live and reproduce in the larval form of aquatic axolotl. In amphibians metamorphosis environmental iodide and T4 stimulate the spectacular apotropals (programmed cell death) of the cells of the larval gills, tail and fins transforming the aquatic tadpole into a “more advanced” terrestrial frog (6). Fig. 1

Contrary to the amphibian metamorphosis, in mammals and humans the thyroidectomy and 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, nerve and cognitive abilities for hunting, with better neurological, visuospatial, olfactory, and cognitive abilities for hunting, as seen in other predatory animals. Similarly happens in the neotenic amphibian salamander, which without introducing iodine, does not transform in terrestrial adult and live and reproduce in the larval form of aquatic axolotl. In amphibians metamorphosis environmental iodide and T4 stimulate the spectacular apotropals (programmed cell death) of the cells of the larval gills, tail and fins transforming the aquatic tadpole into a “more advanced” terrestrial frog (6). Fig. 1

Membrane chemistry

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

"membrane lipid language" (FIG.8)

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

Ventricles, Leukotriene, Prostaglandin, Thromborsane Synthesis

\[
\text{DHA} + \text{iodolactone} \rightarrow \text{iodophospholipids} \rightarrow \text{iodophospholipids in} \quad \text{Leukotriene, Prostaglandin, Thromborsane Synthesis}
\]

Structure of some best known iodolipid molecules

Fig. 3. Iodine in Evolution

Over three billion years ago in the primitive sea, blue-green algae were the first living Prokaryota to produce poisonous oxygen in the atmosphere and fragile oxidable molecules of PUFAs in their lipid cellular membranes. About 500 million years ago some primitive marine fishes started to emerge from the I-rich sea and transferred to fresh waters and then, as amphibians and reptiles, adapted themselves to I-deficient land. Meanwhile, some I-concentrating endodermic cells, originated from primitive foregut of vertebrates, migrated and specialized in uptake and storage of antioxidant iodine in the new follicular thyroid gland, a necessary reservoir for a better adaptation to terrestrial adult and live and reproduce in the larval form of aquatic axolotl. Over three billion years ago in the primitive sea, blue-green algae were the first living Prokaryota to produce poisonous oxygen in the atmosphere and fragile oxidable molecules of PUFAs in their lipid cellular membranes. About 500 million years ago some primitive marine fishes started to emerge from the I-rich sea and transferred to fresh waters and then, as amphibians and reptiles, adapted themselves to I-deficient land. Meanwhile, some I-concentrating endodermic cells, originated from primitive foregut of vertebrates, migrated and specialized in uptake and storage of antioxidant iodine in the new follicular thyroid gland, a necessary reservoir for a better adaptation to terrestrial adult and live and reproduce in the larval form of aquatic axolotl. At the same time, other I-concentrating endodermic cells migrated and became the primitive nervous system and brain. On the contrary, many terrestrial glands eliminated iodine from their own metabolism and used "anti-iodine", goitrogens and anti-THY substances, such as cyanide and cyanogenic glycosides (CN), etc. as pesticides for defense against animal cells of parasites and herbivores.

Fig. 2. Arachidonic Acid Pathway

\[
\text{DHA} + \text{iodolactone} \rightarrow \text{iodophospholipids} \rightarrow \text{iodophospholipids in} \quad \text{Leukotriene, Prostaglandin, Thromborsane Synthesis}
\]

Fig. 4. 5. Sequence of iodide total-body scintiscans of a woman after intravenous injection of 131-iodine (half-life: 8 days) in radioautographies of the body of the rats after subcutaneous injection of radioiodine. High I-concentration is evident in loco-compounds and iodo lipids of choroid plexus, retina, hypothalamus, gastric mucosa and epidermis, where it is detectable up to 5 days after injection. (From Path Biol 1961 and Acta Radiol Ther Physica Biology, 1964.)

Fig. 5. Iodide and T4 trigger the amphibian metamorphosis that transforms the larval tadpole into an adult carnivorous frog, with better neurological, visuospatial, olfactory, and cognitive abilities for hunting, as seen in other predatory animals. Similarly happens in the neotenic amphibian salamander, which without introducing iodine, does not transform in terrestrial adult and live and reproduce in the larval form of aquatic axolotl. In amphibians metamorphosis environmental iodide and T4 stimulate the spectacular apotropals (programmed cell death) of the cells of the larval gills, tail and fins transforming the aquatic tadpole into a “more advanced” terrestrial frog (6). Fig. 1

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