Porphyrians in the physiological «web»

Environment → Metabolism

Phase I CYP 450

Heme → TOXICITY

Mitochondria → TOXICITY

PORPHYRINE PROFILE

HO : Heme Oxygenase
NOs : NO synthase
CBS : Cystathionin - β synthase

CO : Carbon Monoxide
NO : Nitric Oxide
H₂S : Hydrogen Sulfide

Homeostasis → Health → Longevity

O₂ → CO → NO → H₂S

Genome stability

Hb CYP

MPTP
**Porphyrs in health and disease**

**Porphyrs** are components of Heme’s biosynthetic pathway. It is synthetized in the mitochondria of all living things’ cells. **Heme controls oxygen in breath and detoxication** but also **promote the other gas production** like Nitric Oxide (NO), Hydrogen Sulfide (H2S) and Carbon Monoxide (CO) which are, all three of them, **oxygen savers, antioxidants, anti-inflammatory agents** and have a **tissue protective effect**.

Thus, **Heme is a key component of oxygen homeostasis**. The Porphyrin profile can be altered quantitatively by a rise of their synthesis level, qualitatively by a modification of their respective components proportions, or most of the time in both manners :

- **A rise of porphyrinuria** is related with an increase of environmental xenobiotics toxic burden or endobiotics burden coming from our metabolism, or whether a decrease in the potential of the mitochondrial membrane induced by many toxics including some medecines.

- **Qualitatively, a break in the profile balance**, as a joint increase of the three terminated compounds, 5cxP, PcP and coproporphyrin, has been associated by many authors to a latent mercury toxicity.

- **Finally, an isolated rise of coproporphyrin** has been tied to xeno/endobiotics impact and/or an alteration of the mitochondrial function by MPTP* decrease, which is generated by many toxics/medecines.

To the extent that **Heme’s biosynthetic pathway**, sensitive to many toxics, is protected in the mainstay by an effective and multifaceted detoxication system, which is composed of Phase I CYP 450, Phase II transferases, peroxidases, epoxydases, dehydrogenases, including the ALDH (type II) ; a **Porphyrin profile alteration** can be regarded more broadly like an insufficient detoxication capacity of the metabolism regarding the stress it have to deal with.

* MPTP : Membran Pore Transition Potential which is the mitochondrial membran support.

Sources:
4. A cascade analysis of the interaction of mercury and coproporphyrinogen oxidase(CPOX) polymorphism on the heme biosynthetic pathway and porphyrin production, Toxicol Left [Oct 2005]

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