

Distribution and speciation of selenium within Arctic marine ecosystems: a multi-marker approach

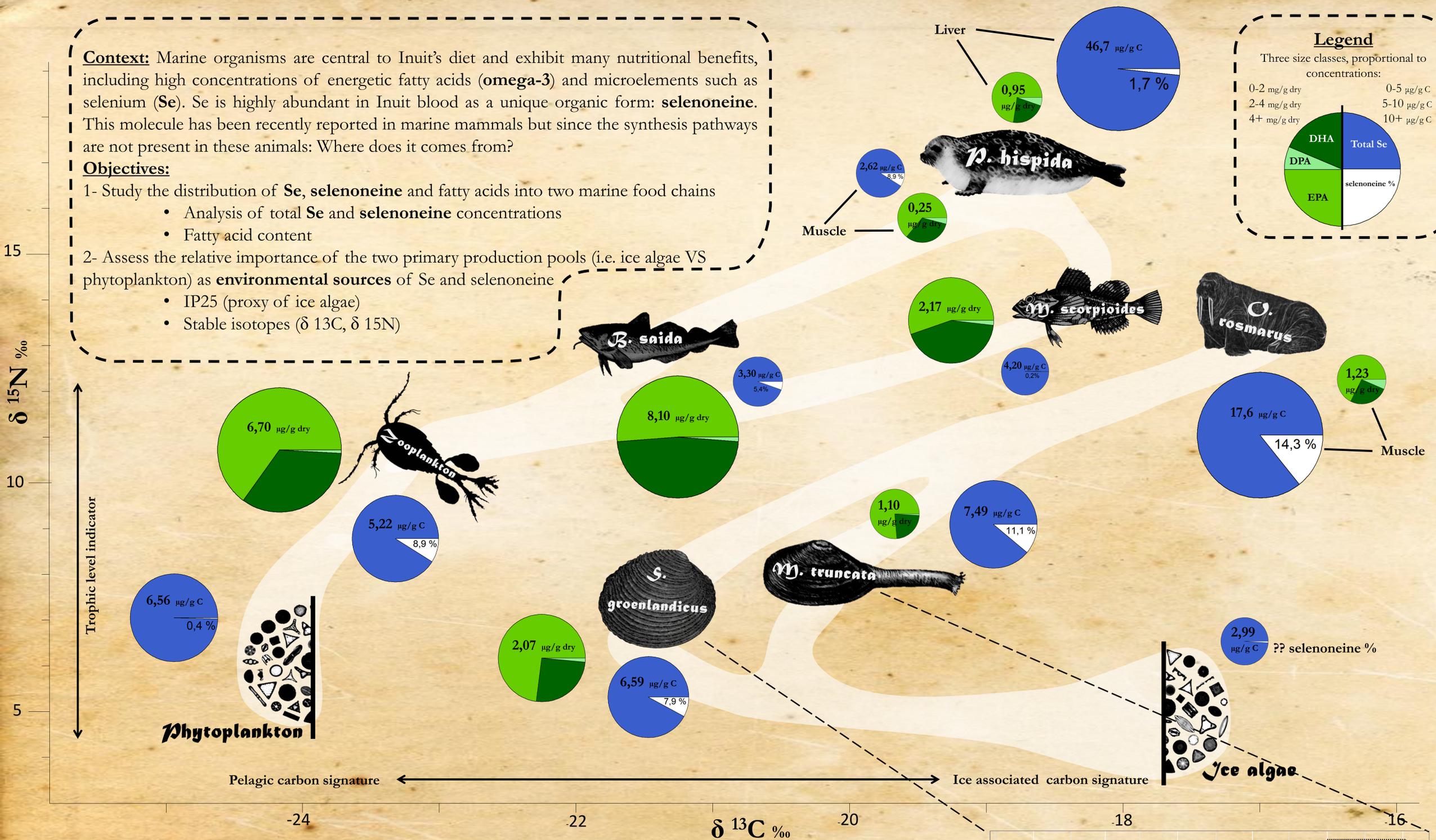
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Context: Marine organisms are central to Inuit's diet and exhibit many nutritional benefits, including high concentrations of energetic fatty acids (**omega-3**) and microelements such as selenium (**Se**). Se is highly abundant in Inuit blood as a unique organic form: **selenoneine**. This molecule has been recently reported in marine mammals but since the synthesis pathways are not present in these animals: Where does it come from?

Objectives:

- 1- Study the distribution of **Se**, **selenoneine** and fatty acids into two marine food chains
 - Analysis of total **Se** and **selenoneine** concentrations
 - Fatty acid content
- 2- Assess the relative importance of the two primary production pools (i.e. ice algae VS phytoplankton) as **environmental sources** of Se and selenoneine
 - IP25 (proxy of ice algae)
 - Stable isotopes ($\delta^{13}C$, $\delta^{15}N$)



Conclusions

- **Selenium** levels are **high** in walrus muscle and in clams, but especially **low** in fish samples.
 - **Selenoneine** is an important form of Se in the marine environment, representing up to 14% of total Se in walrus muscle.
 - Zooplankton, Arctic cod & Sculpin are abundant environmental sources of **omega-3** fatty acids.
- As Se and omega-3 fatty acids are important to human health, country food from the marine environment provide many nutritional benefits. In addition, the identification of selenoneine in relatively high proportions could help counteract methyl-mercury toxicity in Arctic ecosystems. The environmental source of Se and selenoneine remains difficult to assess.
- The **IP25** and $\delta^{13}C$ results confirm that benthic living organisms are highly linked to ice-associated sinking organic matter.
 - Trophic level does not appear to be a relevant factor in Se distribution, fortifying other results in the literature suggesting no biomagnification.

