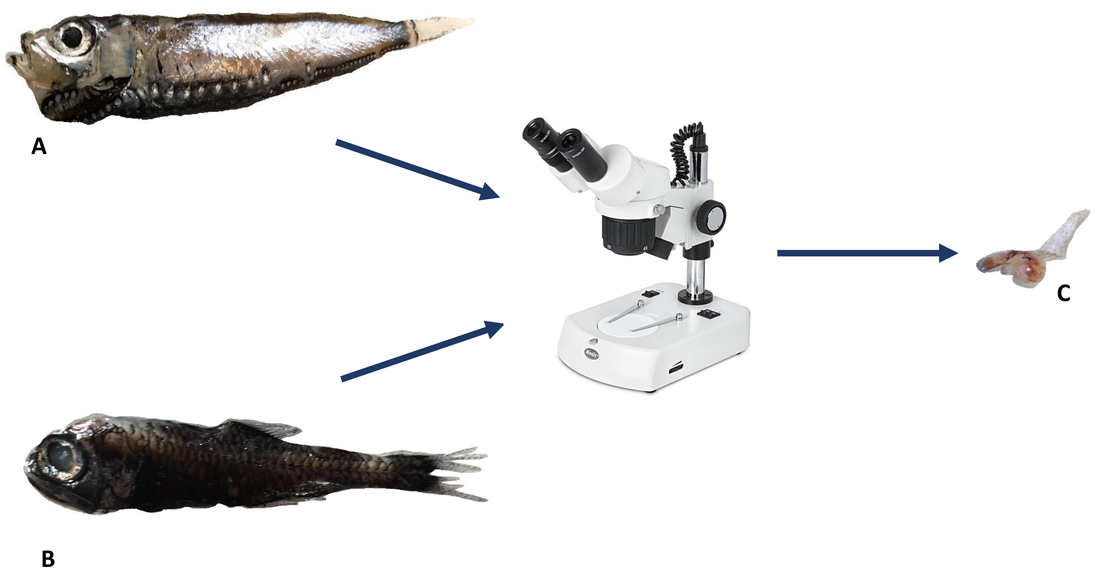
Developing methods for lipid extraction in mesopelagic fish

1 What are mesopelagic fish?

Mesopelagic fish are commonly defined as fish living in the water column of 200-1000 meters depth[1] or defined as the twilight zone.[2] **Mesopelagic fish are probably the most abundant vertebrates on Earth.**[3] In this study, we investigate two different mesopelagic fish species: *Benthosema glaciale* and *Maurolicus muelleri*



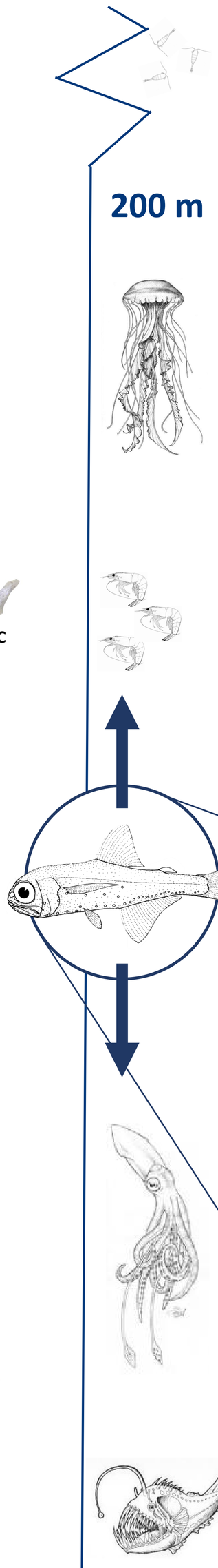
Removing the swimbladder in mesopelagic fish require stereomicroscope and a steady hand. A) is *Maurolicus muelleri*, B) is *Benthosema glaciale* and C) is a swimbladder from a mesopelagic fish for demonstration.

2 The aim of my bio299 project is to look at lipids

- To develop methods to extract total lipid content of the fish.
- To develop methods to isolated swimbladders, and extract lipids from the buoyancy organ.

3 Why is the total lipid content of interest?

***Benthosema glaciale* and *Maurolicus mulleri* both generally have a vertical migration** to the epipelagic zone (0-200m) [1] to feed on zooplankton at night when they are less likely to be seen by visual predators.[4] **The total lipid content of the fish, is a good indicator for the energy reserves** in the fish.[5]



4 Why is the lipid content in swimbladders at interest?

Lipid (wax-esters) in the swimbladder is a known adaptation, in some diel vertically migration mesopelagic fish.[5] Considering acoustic methods for biomass estimations, the swimbladder accounts for most of the backscatter energy in fish echos.[6] However little is known about the distribution of fat-invested swimbladders across different seasons, habitats and species.

5 The future use of this lipid method is to answer sientific questions as:

- Is there variations in lipid content during summer north and south of the Artic Circle in mesopelagic fish?
- Is there a high prevalence of lipid-filled swimbladders as a flexible buoyancy strategy in mesopelgic fish?

The oceans midwater zone is poorly studied, and factors effecting life in the mesopelagic are a complex combination of biotic and abiotic factors. **Light is highly important in structuring the pelagic, and will effect predation and prey behaviour.**

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