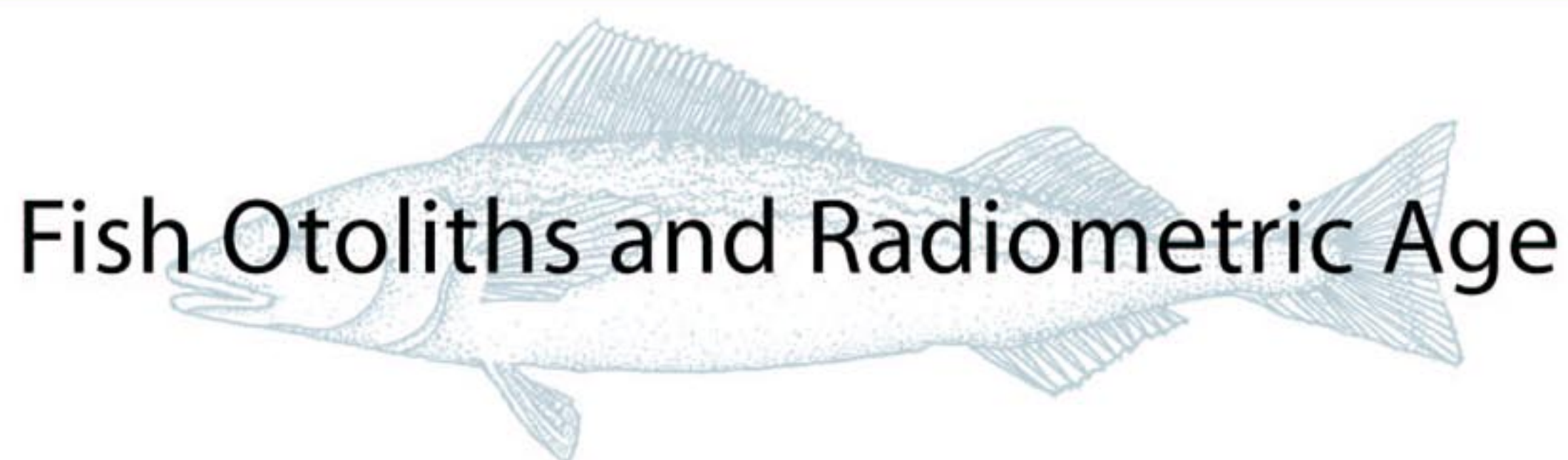


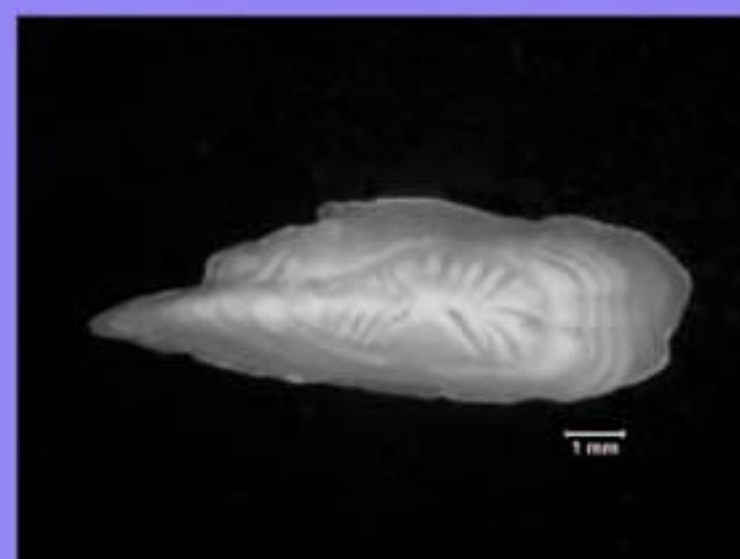
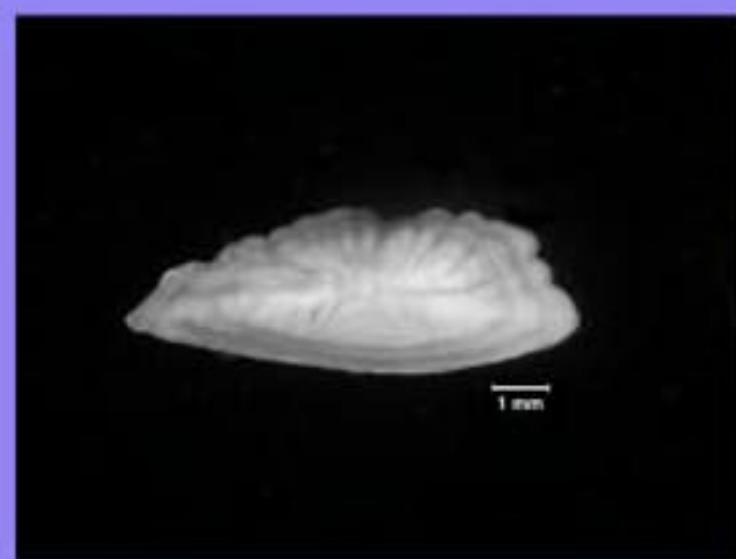
# Age and Growth Program REFM



## Fish Otoliths and Radiometric Age

The conventional method of estimating fish age is by counting rings (annuli) found in fish otoliths. Otoliths are calcium carbonate bone-like structures found in the inner ear. Otoliths contain patterns of concentric rings, similar to those seen in tree trunks, but often not as explicit. Biologists also can use radionuclides to estimate fish age.

A sablefish otolith showing three clear annuli.



A sablefish otolith with approximately 20 annuli. Note that the last 15 annuli are difficult to distinguish.

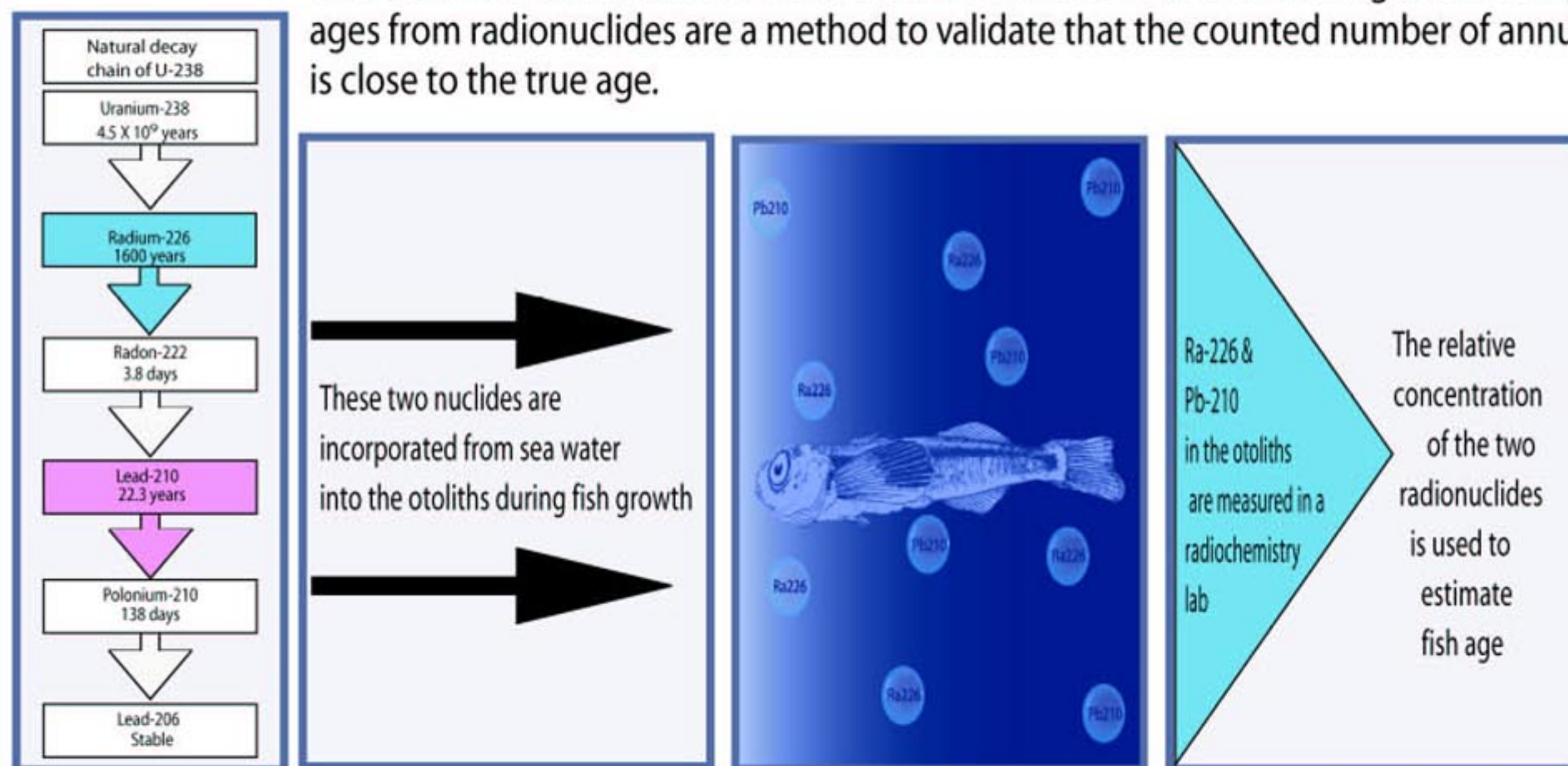
### Normal Ageing Procedure

Otoliths are examined using a microscope to count the number of annuli



### Radiometric Ageing Procedure

Radionuclides can be used as an alternative method to estimate fish age. Therefore, ages from radionuclides are a method to validate that the counted number of annuli is close to the true age.



Equipment used for separating radionuclides from otoliths



Nuclear instruments are used to measure the radionuclides

