

## **Taphonomic controls on the distribution of melanosomes in tissues from river lamprey (*Lampetra fluviatilis*) and the implications for interpreting the anatomy of *Mayomyzon pieckoensis* from the Carboniferous, Mazon Creek Lagerstätte.**

Christopher Nedza (1), Mark Purnell (1), Jakob Vinther (2), and Sarah Gabbott (1)

(1) Department of Geology, University of Leicester, Leicester, United Kingdom (can18@le.ac.uk), (2) Department of Earth Sciences, University of Bristol, Bristol, United Kingdom

Pigment bearing organelles – melanosomes – are found in a variety of tissues across a broad range of taxa. Melanin, the pigment found within these organelles, has an array of uses, including determining colouration patterns in integument, alongside acting as an antimicrobial agent in vertebrate organs. Famously, work on fossilised melanosomes has enabled palaeontologists to reconstruct the colour patterning of extinct organisms thereby providing ecological insights. Recent studies on the retina of vertebrate fossils have demonstrated the potential for fossil melanosomes to help elucidate phylogenetic relationships. However, little is known about the distribution and morphology of melanosomes throughout a single taxon in different tissues and how their distribution may be affected by decay. Here we present preliminary results into the distribution and morphology of melanosomes within different tissues of the extant river lamprey, *Lampetra fluviatilis*, in comparison to the extinct Carboniferous lamprey *Mayomyzon pieckoensis*. These data indicate that melanosome morphology can vary between different tissues in *M. pieckoensis*, particularly melanosomes found within the eyes. This has significant implications for interpreting the pigmented anatomy of extinct organisms, and provides evidence that understanding melanosome distribution and morphology could help untangle debates surrounding controversial interpretations of pigmented anatomy.