

## Investigating the Mitochondrial Adaptations of *Proteromonas lacertae*

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*Proteromonas lacertae* is an anaerobic, biflagellated microbial eukaryote belonging to Stramenopiles, one of the largest and most diverse groups of eukaryotes, characterised by the presence of tripartite, hair-like structures on the larger of the two flagella, thought to aid in cell motility. At least one microbial Stramenopile is known to not possess these characteristic features, *Blastocystis*, which does not resemble other organisms from this group in any way, but, in spite of them being morphologically very different, *Proteromonas* happens to be the closest-known relative of *Blastocystis*. They are also some of the only Stramenopiles known to colonise larger organisms, *Proteromonas* is found in the hindgut of lizards and *Blastocystis* is known to colonise the intestinal tract of a range of animals, yet whether either of them actually cause disease has yet to be confirmed. Despite the closeness of the relationship between both of these eukaryotes, not only is their morphology strikingly different, their mitochondria also bear no resemblance to one another. *Blastocystis* possesses multiple anaerobic mitochondria-related organelles (MROs), in contrast, *Proteromonas* has a single, large lobed mitochondrion. A striking biochemical observation making *Blastocystis* unique amongst Stramenopiles is the presence of an alternative oxidase, and the absence of complexes III, IV and V of the electron transport chain (ETC). As well as this, it has been predicted to harbour proteins that could establish a reduced/incomplete tricarboxylic acid (TCA) cycle in its MROs. The main focus of this investigation is to explore the mitochondrial protein composition of *Proteromonas* and compare it to *Blastocystis*. In addition, we will attempt to characterise some of the biochemical pathways, including the ETC, proteins involved in the TCA cycle and AOX. Preliminary results on these investigations will be presented. This data shows that, biochemically, *Proteromonas* and *Blastocystis* are very similar, suggesting that these mitochondrial adaptations occurred prior to the diversification of these two organisms.