Localized high abundance of Marine Group II archaea in the subtropical Pearl River Estuary: implications for their niche adaptation

With the support by the National Natural Science Foundation of China, the research team directed by Prof. Zhang ChuanLun (张传伦) at the Department of Ocean Science and Engineering, South University of Science and Technology, recently reported that Marine Group II archaea are highly abundant in the eutrophic Pearl River Estuary (PRE), which was published in *Environmental Microbiology* (2018, 20: 734—754).

Marine Group II archaea (MGII) are widely distributed in global oceans and dominate the total archaeal community within the upper euphotic zone of temperate waters. However, factors controlling the distribution of MGII are poorly delineated and the physiology and ecological functions of these still-uncultured organisms remain elusive.

In this study, Zhang and colleagues detected high abundance of particle-associated MGII in the PRE (up to 10^8 16S rRNA gene copies/l), which was ~10-fold higher than previously reported from other marine environments. Considering the heterotrophic lifestyle of MGII, the reason for their blooming might be the abundant phototrophs stimulated by extensive nutrient input from upper rivers. The 10‰ salinity appeared to be a threshold value for these MGII whose abundance decreased sharply below it. Above 10‰ salinity, the abundance of MGII on the particles was positively correlated with phototrophs. MGII from the surface water was negatively correlated with irradiance, suggesting both salinity and light have significant effects on the growth of MGII. The team also assembled the first MGII genome (named MGIIa_P) from an estuarine environment. Compared with the former MGII genomes, MGIIa_P contains a catalase gene, which might be involved in scavenging reactive oxygen species and thus important for their abundances in PRE.

These findings indicate MGII might play a significant role in metabolizing organic matters in the PRE and other temperate estuarine systems.

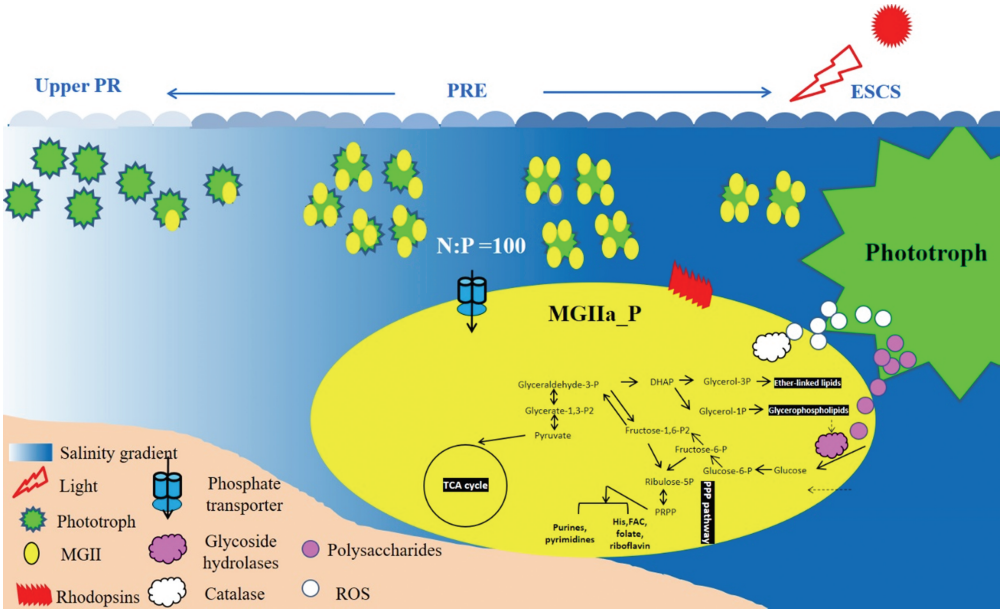

Figure The environmental factors controlling the blooming of MGII and the genetic advantages for MGII niche adaptation.