

Time to move forward: Looking at microbes by the view of single cell technologies

Manuel Martínez-García

University of Alicante, Spain

It is well known that cultivation techniques do not recover the vast majority of uncultured microbes in nature. To circumvent these limitations, past and current efforts based on metagenomics have significantly and unquestionably broadened our knowledge in microbial ecology. However, despite improvement of assembly, metagenomics largely fails to recover discrete genomes from uncultured microorganisms. Recently, single cell genomics has emerged as a new and powerful strategy in microbial ecology, opening thus new avenues to disentangle the genomic information of most uncultured microbial groups. Outstanding publications on marine environments have for instance identified major polysaccharide bacterial degraders in planktonic systems. In addition, the in situ interaction of major protist and prokaryote groups has also partly elucidated. Another powerful example is the discovery of chemolithoautotrophic pathways in uncultured Proteobacteria in the vast unknown mesopelagic environments. These together with other studies are only the tip of the iceberg and we will see a boom of single cell genomics in the coming years.

Sitting down writing here the last sentences, I am thinking about what's next within this "revolution": maybe single virus genomics might help us to decipher the genomic diversity of major environmental or pathogenic viruses? Or might be single cell transcriptomics?... Whatever it comes from looking at individual microorganisms without missing the whole picture of microbial communities view (i.e. -omics technologies) and linking that with comprehensive experiments in the lab, I will embrace it.

Biography

Manuel Martínez-García was graduated with full marks and honors in Biology from the University of Alicante (Spain) and received his PhD in Molecular Microbial Ecology in 2005. He conducted three short postdoctoral European stays in reputed research centres such as the Max Planck Institute for Marine Microbiology (Germany). During 2009-2011, he developed cutting-edge techniques on Single Cell Genomics combined with Metagenomics to study the metabolic capabilities of uncultured microbes at the Bigelow Laboratory for Ocean Sciences (Maine, USA). He has published several papers in high-impact journals based on single cell technologies. Currently, he is back to Spain as assistant professor in Microbiology and is serving as an editorial board member of the Oceanography-Open Access Journal.

m.martinez@ua.es