

Emmo Hamann

Syntrophy in anaerobic protist-bacterial communities

Contents

1	Introduction	1
1.1	Structural characteristics of protists	2
1.2	Ecology of anaerobic marine protists	3
1.3	Diversity and phylogeny of anaerobic protists	4
1.4	Anaerobic energy metabolism in protists	6
1.5	Coping with anoxia: syntrophy and symbiosis	9
1.6	Objectives	12
1.7	References	13
2	Publications	17
2.1	Environmental <i>Breviatea</i> harbor mutualistic <i>Arcobacter</i> epibionts	18
2.2	Syntrophic linkages between the anaerobic predatory flagellate <i>Carpediemonas frisia</i> sp. nov. and specific prokaryotic populations	49
3	Discussion	77
3.1	Anoxia as a catalyst of mutualistic symbiosis	78
3.2	Origins of NAD(P)H-dependent hydrogenases in eukaryotes	80
3.3	<i>Breviatea</i> as evolutionary transition host for pathogenic bacteria	81
3.4	Protists as shuttles for pathogenic bacteria	82
3.5	Protists as drivers of prokaryotic community dynamics	82
3.6	Conclusion and Outlook	84
3.7	References	87
4	List of Publications	91
5	Acknowledgement	93