

AMIN MOHAMED

amin.mohamedesmail@my.jcu.edu.au

PhD candidate 2012 to 2015

ARC CoE Coral Reef Studies, School of
Pharmacy and Molecular Science

Egyptian Government PhD Scholarship

AIMS@JCU Top-Up Scholarship

Supervised by:

Prof David Miller (JCU)

Dr David Bourne (AIMS)

Prof Bette Willis (JCU)

Dr Vivian Cumbo (JCU)

Dr Susanne Sprungala (JCU)

Distribution and characterisation of chromerids and apicomplexans associated with coral reefs

Amin was born and raised in Egypt where he completed his BSc in Zoology in 2006. He continued at Benha University as a teaching assistant, where under the supervision of Dr Hany Abdel-Salam, he developed an interest in coral reef research. In 2011, Amin was awarded a MSc for a project that provided baseline data on the health of coral in the Egyptian Red Sea.

Reef-building corals are considered as meta-organisms where the coral animal lives in mutualistic relationships with many microorganisms including bacteria, archaea, fungi, and viruses, as well as photosynthetic dinoflagellates of the genus *Symbiodinium*. *Symbiodinium* belongs to a group of protists called alveolates and their relation with corals has been well established. However, recent studies have identified a number of other related alveolates associated with corals; including newly discovered chromerids as well as many from apicomplexan-related lineages (ARLs). Amin's project will provide a fundamental understanding of the role chromerids and apicomplexans play in coral health, which may identify organisms as symbionts or parasites.

The availability of complete genome data from the common indo-pacific coral species, *Acropora digitifera*, comprehensive transcriptome assembly for *A. millepora* and more recently for *Symbiodinium* have stimulated the development of efficient and informative techniques for large scale and genome-wide analysis of gene expression and comparative genomics and transcriptomics. By using next-generation sequencing (NGS), Amin will investigate the functional role of *Chromera velia* in corals and its impact on coral fitness through conducting quantitative analysis of *A. millepora* and *A. digitifera* gene expression following *C. velia* infection. Gene expression levels in *A. millepora* and *A. digitifera* larvae exposed to *C. velia* will be compared with larvae exposed to a compatible *Symbiodinium* strain, using the mRNA sequencing (Illumina RNA-seq) technology. The work also aims to use ecological genomics tools to provide the baseline knowledge on the biogeographic distribution of chromerids and apicomplexans in different locations in the Great Barrier Reef (GBR) and their association with different coral hosts.

During 2013 coral spawning events in Okinawa, Japan and Orpheus Island, the GBR, infection experiments were conducted using 2 different isolates of *C. velia*. Analysing the huge next generation sequencing data from those experiments will be the next challenge, requiring extensive bioinformatics analyses.



AMIN MOHAMED

Publications

Mohamed, Amin R., Abdel-Hamid A.M. Ali, Hany A. Abdel-Salam (2012) Status of coral reef health in the northern Red Sea, Egypt. In: Yellowless D, Hughes TP (eds) *Proceedings of the 12th International Coral Reef Symposium*, Cairns, Australia, 9-13 July 2012. 9A Coral bleaching and climate change. James Cook University, Townsville.