Characterisation of the intra-cytoplasmic membrane from the aerobic anoxygenic phototrophic Gammaproteobacterium *Congregibacter litoralis* KT71.

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Congregibacter (Cgb.) litoralis KT71 is an aerobic anoxygenic phototroph (AAP), meaning that it requires oxygen for chemoheterotrophic growth but is able to perform anoxygenic photosynthesis as required. KT71 belongs to the main AAP group in the ocean [4] and so is probably one of the most abundant anoxygenic phototrophic bacteria on Earth and is very distantly related to the strictly anaerobic Gammaproteobacteria Families, Ectothiorhodospiraceae and Chromatiaceae.

Purple bacteria and AAPs produce additional membranes, called intra-cytoplasmic membranes (ICM) that contain the complete enzymatic machinery necessary for photosynthesis. The photosynthetic complexes in the ICM contain pigment-protein, light-harvesting (LH) complexes that supply light-energy to a type-2 reaction centre (RC), where it is used to induce a charge separation across the membrane and initiate the conversion of light energy to chemical energy. These complexes are essentially a protein antenna scaffold that bind Bchl and carotenoid molecules in precisely the correct orientation to allow efficient energy transfer to take place. Within the ICM all species of anoxygenic phototrophs have an antenna called LH1 that surrounds and is intimately associated with the RC to form the RC-LH1 'Core'. Some species also have a second, peripheral (to LH1) LH antenna called LH2 and it is known that within the AnAP there are many species-dependent variations amongst both LH1 and LH2 complexes.

In spite of the wide distribution of *Cgb. litoralis* KT in Nature very little is known about the bacterium or photosynthetic complexes that it contains. Therefore, a detailed biochemical and biophysical investigation was performed into the ICM, RC-LH1 'Core' and LH2 of *Cgb. litoralis*. The results presented aim to compare and contrast the complexes from this overlooked, but ecologically important species, with complexes already described from other phototrophic species.