INTRODUCTION

Temperature is considered one of the main driving mechanisms impacting oceanic biogeochemical cycles (Sarmiento et al., 2004). Heterotrophic bacterioplankton, at the base of the marine trophic web, is the engine that turn such cycles, by e.g., mediating the remineralization of massive amounts of dissolved organic carbon produced daily by primary producers (Robinson and Williams, 2005; Boyd et al., 1999). The impact of temperature on bulk bacterial production and respiration rates in the ocean have been the focus in a number of studies (refs). It is realistic to assume that global warming will significantly impact bacterioplankton abundance and community composition (Pomeroy and Wiebe, 2001). In addition, marine microorganisms participate in climate regulating processes such as the dynamics of greenhouse gases and the formation of clouds (Simó and Dachs, 2002). Therefore, changes in bacterioplankton composition and activity, expected with rising temperatures, will have a feedback effect of as yet unknown consequences.

An impact of warming on general phenotypic traits such as biomass and cell size have been found in a decadal study of coastal bacterioplankton communities and also in experimental assays (Morán et al., 2015). However, the response of prokaryotic taxa to temperature differs among them (Pittera et al., 2014; Arandia-Gorostidi et al., 2017), but we still lack knowledge of how this important parameter impacts the metabolism of ecologically relevant bacteria.

Dokdonia is a model marine organism in the Flavobacteriia class (phylum Bacteroidetes). Especially this class represents a significant fraction of the oceanic bacterioplankton (Cottrell and Kirchman, 2000; Glöckner et al., 1999; Abell and Bowman, 2005; Alonso et al., 2007). Like about half of the bacterioplankton cells (Venter et al., 2004), Dokdonia harbors the rhodopsin gene that promotes better growth under light (Gómez-Consarnau et al., 2007; Gómez-Consarnau et al., 2016; González et al., 2011). The molecular mechanism that make the bacterium benefit from growth in the light is not clear, although the diel cycle might have an impact on the carbon flow inside the cell (Palovaara et al., 2014). Also, several light detecting mechanisms feature its gene repertoire. These studies show that Dokdonia regulates its gene expression, which might explain its better growth in the light. In addition, further genomic studies depict an organism with a particle-associated lifestyle and adaptations to grow on polymeric substances in seawater (Buchan et al., 2014).

Most studies on the effects of thermal stress on microbial gene expression have been carried out in terrestrial and laboratory model under extreme conditions or under sharp temperature increases. As such, some gene expression patterns are expected, e.g., the upregulation of heat-shock protein genes in response to heat stress, or cold-shock proteins in response to cold temperatures. Potentially sensitive metabolic pathways can be detected by examining whole gene expression patterns. Likewise, gradual physiological adaptations are likely to result from biochemical adjustments to temperature. In this study, Dokdonia MED134 was acclimated for several months to growth in a temperature range from 10 to 34ºC in conditions of light and darkness. The physiological response was studied using transcriptome analyses to detect changes in gene expression and pathways in response to temperature.

Understanding how

(2) La importancia de la temperatura en la regulacion del metabolismo de las bacterias marinas

(3) lo poco que sabemos de la respuesta del metabolismo a la temperatura en el rango mesotrofico. y que lo regula...si es desde nivel transcripcional o si se regula mas a nivel de proteina y cinetica enzimática.

y resaltar que la mayor parte de lo que sabemos de los genes que se expresan a distintas temperaturas viene sobre todo de experimentos de estres térmico (bien frio o calido) pero son experimentos de shock a temperaturas extremas

Al final, el objetivo es intentar explicar si las diferencias de tasas de crecimiento tienen tambien una base transcripcional...es decir, la celula regula las vias metabolicas que está expresando a distintas temperaturas para intentar maximizar su tasa de crecimiento en esas condiciones?

MATERIALS AND METHODS

MED134 cultures were grown on XXX media containing alanine as a carbon source on 12 light:12 night cycle, and long-term acclimated to four temperature treatments along their thermal niche. RNA samples were collected during exponential growth of cultures acclimated to the different temperatures.

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