Seminario

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Unveiling the biosynthesis of membrane spanning lipids in the marine bacterium *Thermotoga maritima*.

The cytoplasmic membrane represents the boundary between the cell itself and the surrounding environment and it has been seen to adapt in response to changes in the environment. The hyperthermophile bacterium Thermotoga maritima has a membrane formed by fatty acids, long-chain dicarboxylic (diabolic) acids and their ether derivatives. Due to their membrane-spanning nature, diabolic acids link the leaflets of the cytoplasmic membrane making it more rigid, allowing the membrane to adapt to extreme conditions such as high temperature . Although the building blocks for the biosynthesis of diabolic acids are known to be fatty acids, the exact mechanism of how these hydrocarbons chains are condensed to form a unique membrane spanning structure remains unknown. To identify the mechanism underlying the biosynthesis of membrane spanning lipids in T. maritima we examined the lipid composition of T. maritima under different growth conditions. Upon cultivation, the fatty acid and diabolic acid profile were progressively modified as the stationary phase of growth was reached, fatty acid content was decreased with a concomitant increase of diabolic acid. Furthermore, when the diabolic acid content was analyzed at different growth temperatures (55°C, lowest growth temperature and 80°C, optimal growth temperature) we noticed that increasing temperature of growth contributed significantly to the accumulation of diabolic acids. In addition, we have found that supplementation of vitamins to the growth media, leads to the formation of a novel C33 diabolic acid. Ongoing analyses will investigate protein level changes under the physiological conditions identified here which change the membrane composition.