Séminaire

CONFÉRENCIER INVITÉ

Vendredi 22 Septembre 2017 à 11h

Salle des séminaires

Institut de biologie structurale - 71 avenue des Martyrs CS 10090 38044 Grenoble Cedex 9 - T.+33 (0)4 57 42 85 00

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Mother cell-to-forespore signaling by pyruvate dehydrogenase during sporulation in *Bacillus subtilis*

At an intermediate stage in sporulation by *Bacillus subtilis* a channel is formed between the mother cell and the forespore that is required for the completion of development. Mutations that block channel assembly arrest late gene expression and result in instability and collapse of the forespore membranes, and loss of compartmentalized gene expression. The channel forms a feeding tube through which the mother cell is thought to maintain the potential for macromolecular synthesis in the forespore. We show that the E3 component of pyruvate dehydrogenase, coded for by the *pdhD* gene, as well as the Krebs cycle enzymes CitH and CitG localize throughout the mother cell cytoplasm early in sporulation. In contrast, no accumulation in the forespore is seen, suggesting that the Krebs cycle does not functions in this cell. Depletion of PdhD using an inducible protease, results in rapid lysis of sporulating cells, suggesting that the Krebs cycle is essential in the mother cell. At an intermediate stage in sporulation, however, while CitH and CitG remain dispersed throughout the mother cell cytoplasm, PdhD localizes to the surface of the developing spore. We show that other subunits of the pyruvate dehydrogenase complex have a similar localization, and form a complex in the mother cell. Importantly, the localization of PdhD to the surface of the developing spore relies on synthesis of SpoIIIAH, a mother cell-specific component of the channel. SpoIIQ, a forespore-specific channel component, remains localized to the forespore membranes in the *pdhD* mutant. This suggests that PdhD is involved in mother cell-to-forespore signalling rather than in channel assembly. PdhD thus seems to have two functions during sporulation in the mother cell. Firstly, it functions as a cytoplasmic enzyme, together with Krebs cycle enzymes and we posit that this activity is likely to be required in both the mother cell and the forespore. Secondly, it localizes to the developing spore, in close proximity to the channel. We speculate that the second function of PdhD may be related to the transport of acetyl-CoA produced in the mother cell to the forespore, promoting the acetylation and inactivation of key enzymes in preparation of the forespore for dormancy.

Hôte : Cécile Morlot (IBS/Groupe Pneumocoque)