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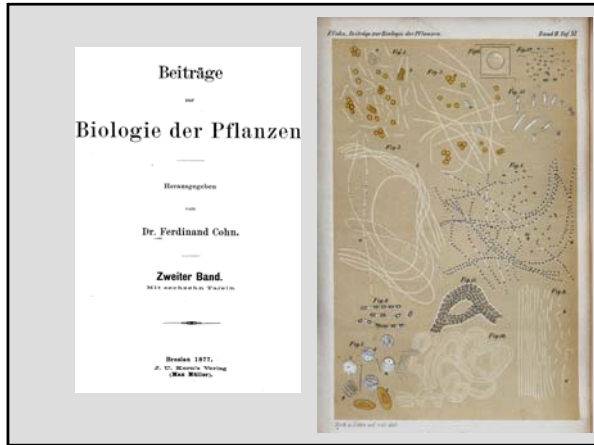
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Part I: how *Bacillus subtilis* makes a spore.

Part II: new research on multicellularity.

Part III: stochasticity and cell fate.

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How *B. subtilis* Makes a Spore

1. Spore formation is a tale of two cells.
2. Cell-specific transcription factors drive gene expression.
3. The two cells talk to each other!

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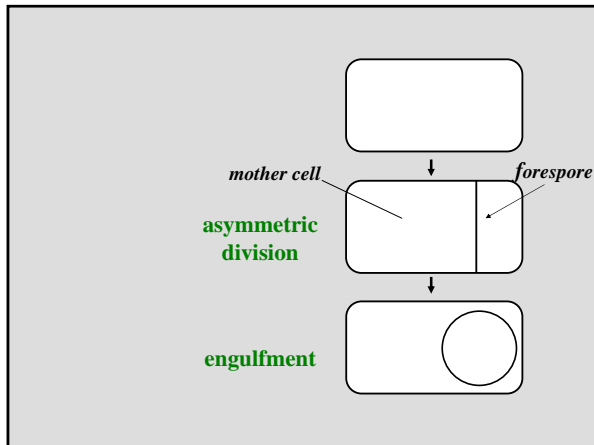
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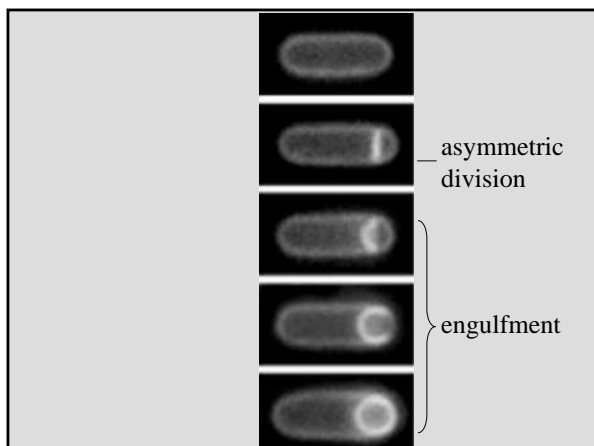
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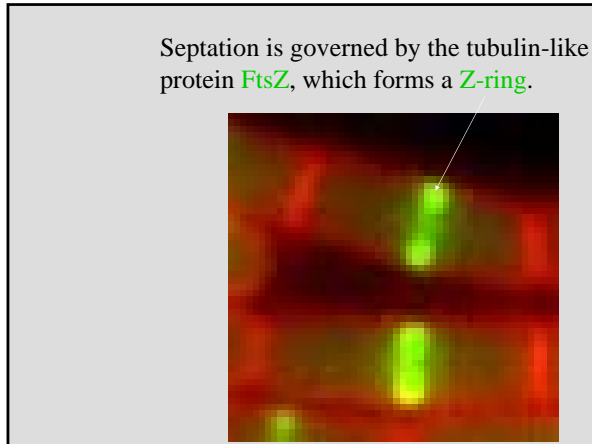
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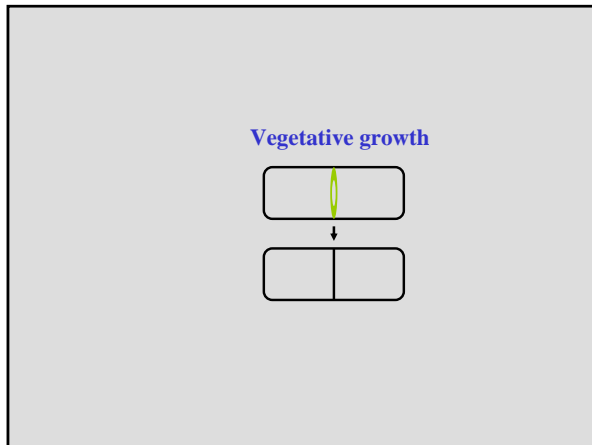
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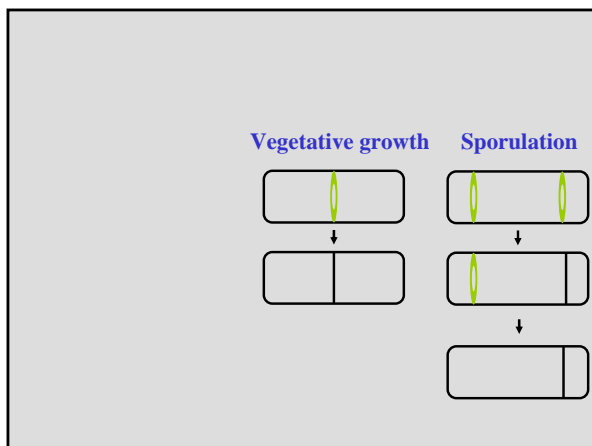
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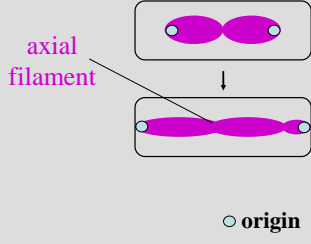
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The first step in chromosome segregation is anchoring replication origins to the poles.



axial filament

○ origin

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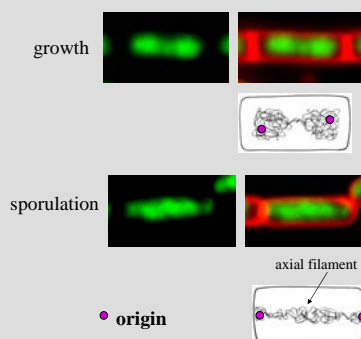
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Origins anchored at the cell poles.



growth

sporulation

axial filament

● origin

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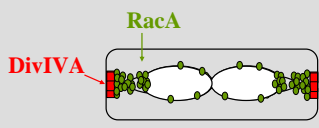
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RacA anchors origins to the DivIVA protein at the poles



RacA

DivIVA

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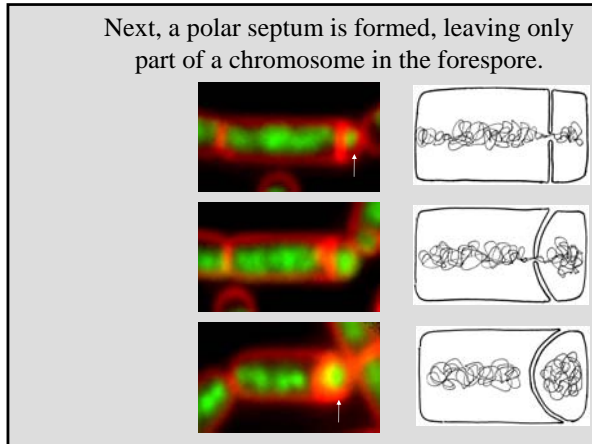
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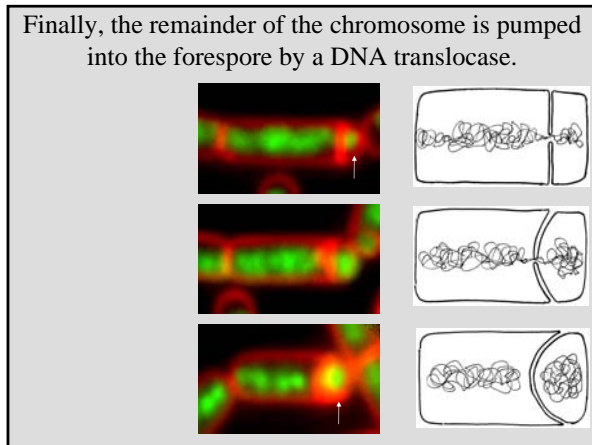
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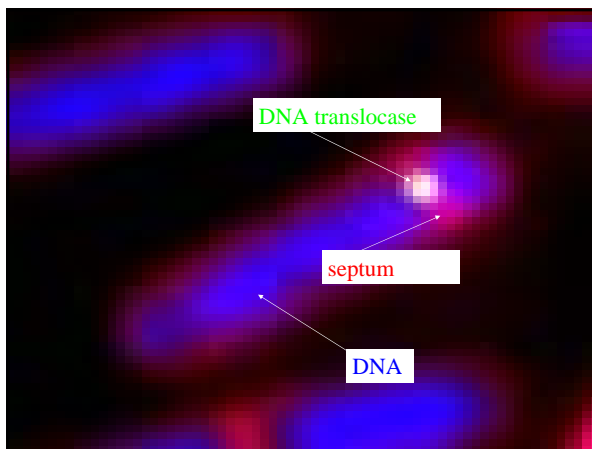
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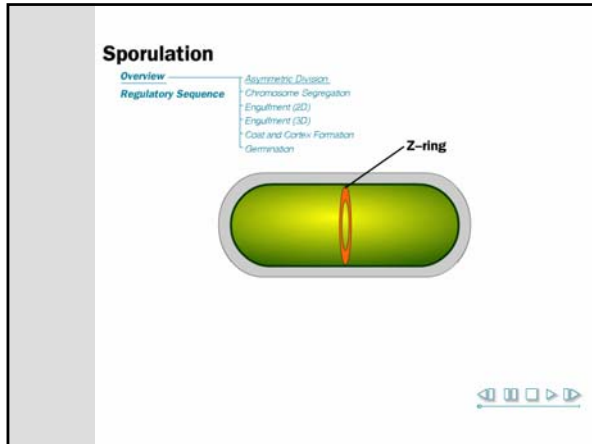
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### How *B. subtilis* Makes a Spore

1. Spore formation is a tale of two cells.
2. **Cell-specific transcription factors drive gene expression.**
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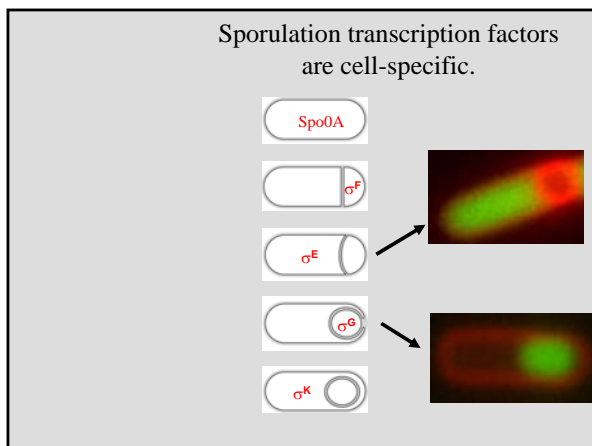
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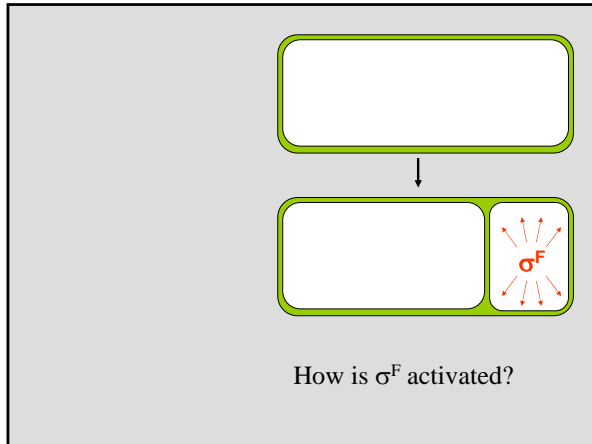
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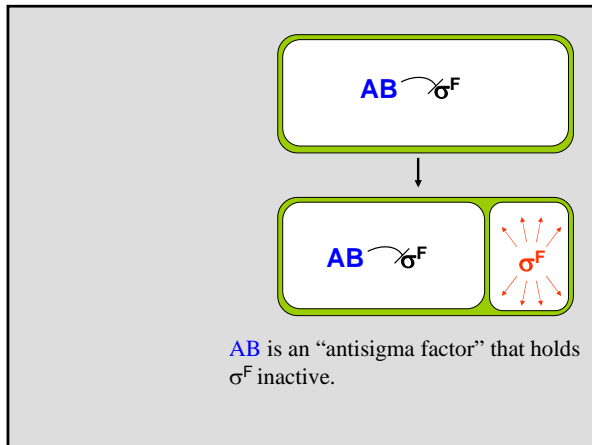
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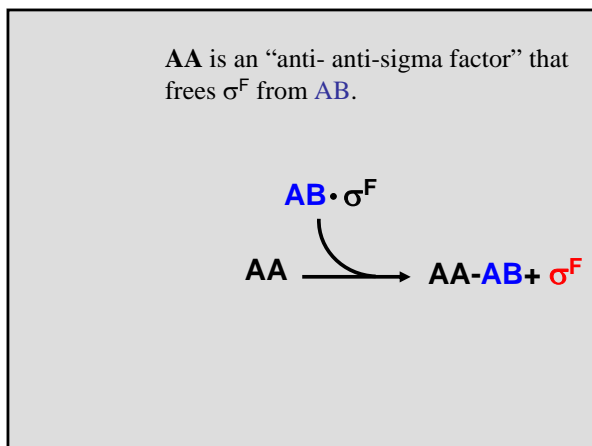
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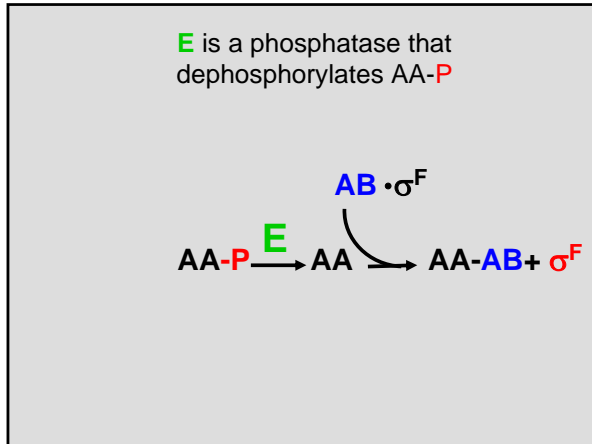
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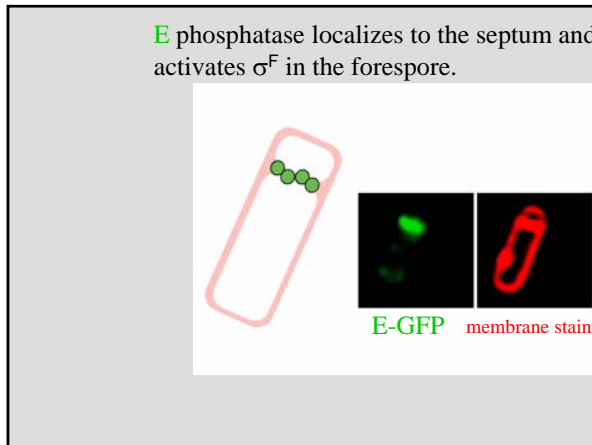
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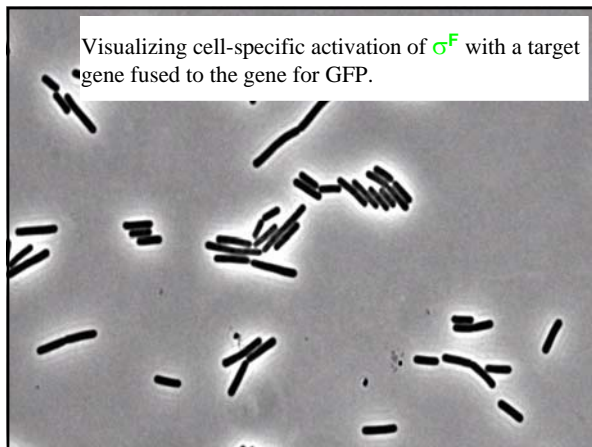
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How *B. subtilis* Makes a Spore

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A two-way conversation



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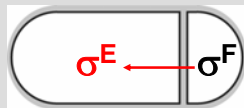
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A two-way conversation



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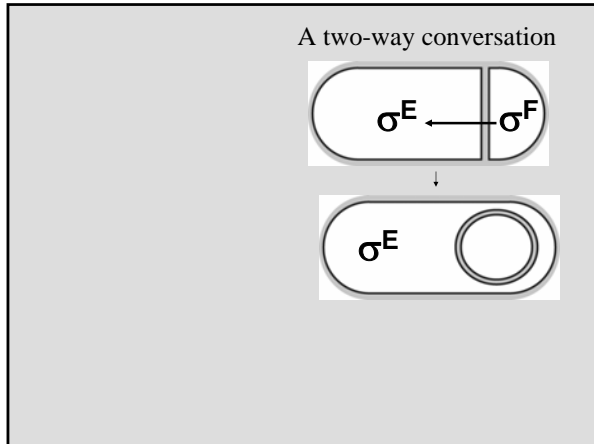
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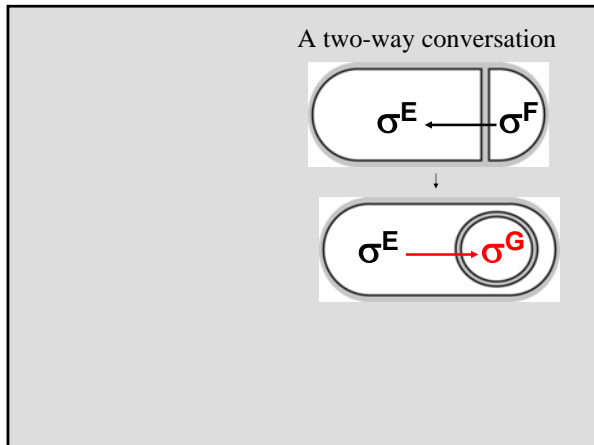
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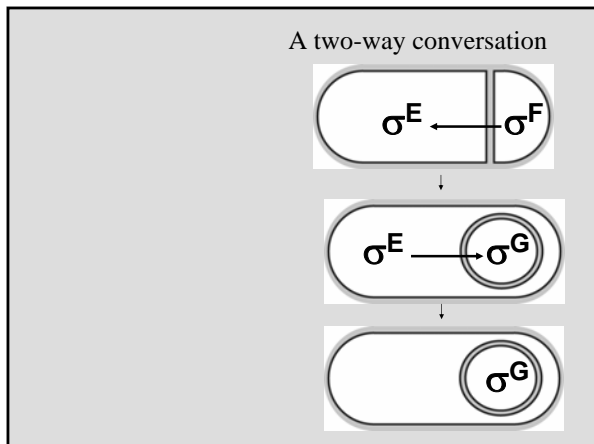
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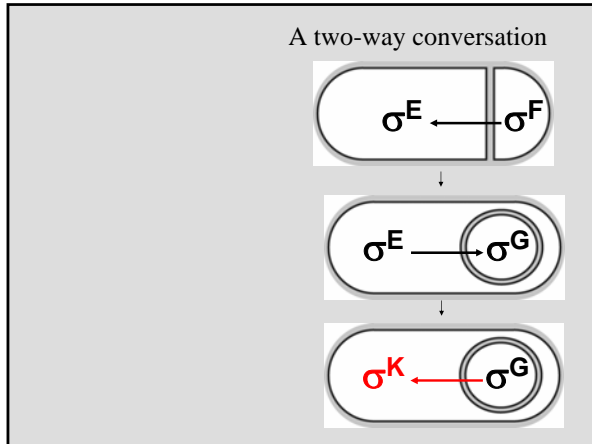
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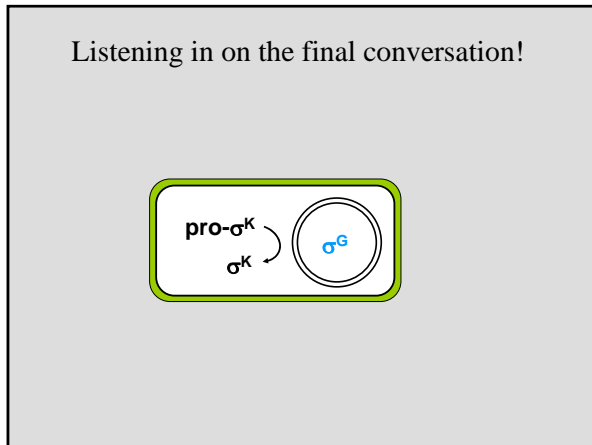
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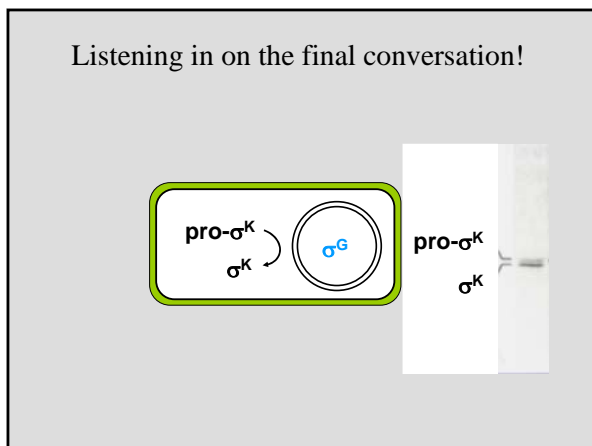
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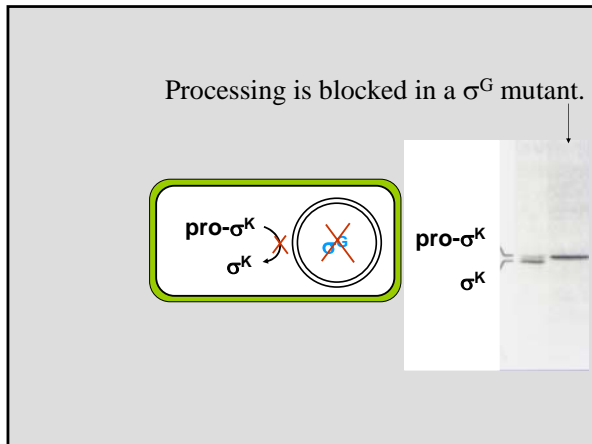
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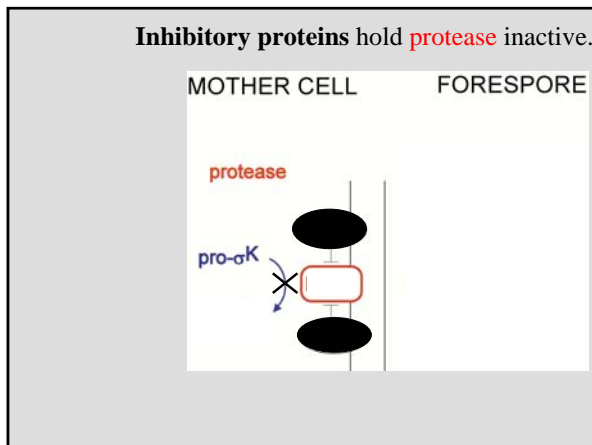
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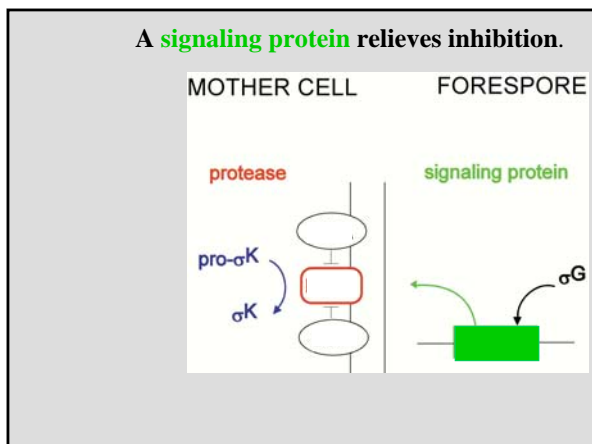
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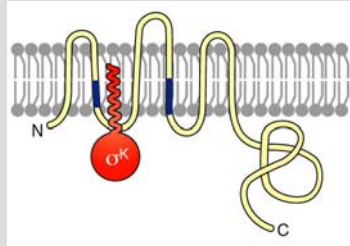
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Bacterial protease has homology to mammalian protease that activates transcription factor for cholesterol metabolism!



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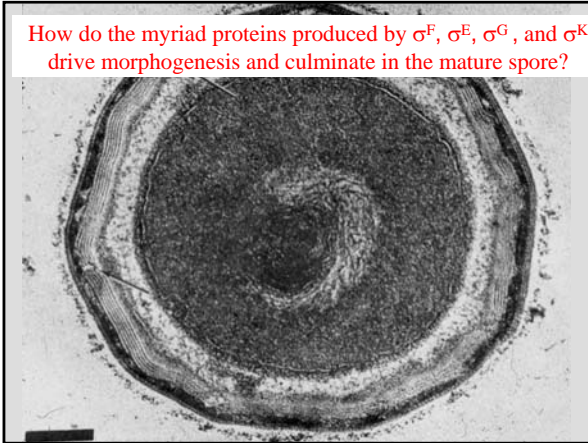
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How do the myriad proteins produced by  $\sigma^F$ ,  $\sigma^E$ ,  $\sigma^G$ , and  $\sigma^K$  drive morphogenesis and culminate in the mature spore?



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