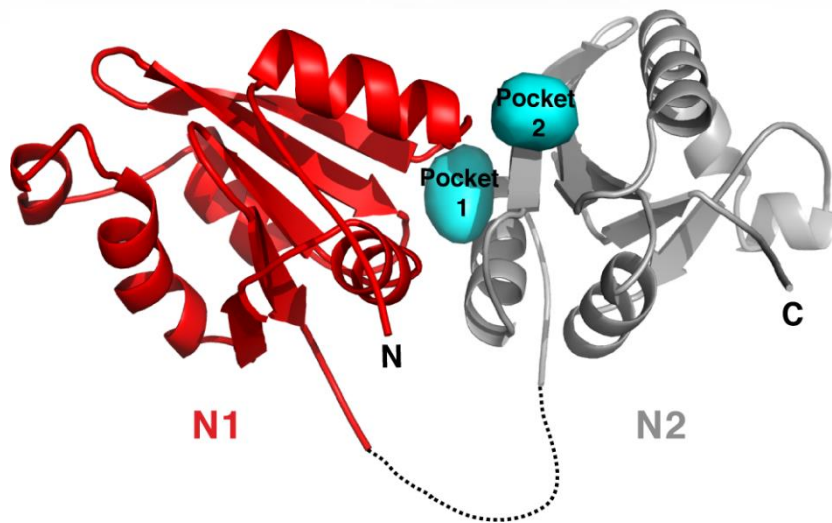


A Structural Understanding of Spore Germination



Crystal structure of the N-terminal domain (NTD) of the A subunit of the *Bacillus megaterium* GerK₃A germinant receptor (GR). The disordered linker region is marked by a dashed line. The predicted germinant-specific binding pockets (cyan) are located at the interface between the N1 (red) and N2 (grey) subdomains of GerK₃A^{NTD}.

Y. Li, K. Jin, A. Perez-Valdespino, K. Federkiewicz, A. Davis, M.W. Maciejewski, P. Setlow, and Bing Hao. *PNAS* **116** (23), 11470–11479 (2019).

Work was performed in part at Brookhaven National Laboratory

Scientific Achievement

The structure of GerK₃A^{NTD} reveals a structure-based mechanism for germinant recruitment that triggers spore germination.

Significance and Impact

Structural details enable development of agents to promote spore germination, making them more susceptible to routine disinfection.

Research Details

- Bacterial endospores can act as vectors for food spoilage as well as some infectious diseases.
- Germination of spores reduces their resistance properties, allowing for disinfection.
- Specific nutrients trigger spore germination through recognition by cognate germinant receptors.
- Macromolecular crystallography was performed at NSLS-II beamline AMX along with molecular docking, biophysical, and genetic analyses.
- Results showed that the germinant-specific binding pocket is located at the interface between the GR-A protein's two subdomains (N1, N2).