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Understanding Bacterial Ice Nucleation

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Bacterial ice-nucleating proteins (INPs) promote heterogeneous ice nucleation better than any known material. On the molecular scale, bacterial INPs are believed to function by organizing water into ice□like patterns to enable the formation of embryonic crystals. However, the details of their working mechanism remains largely elusive. Here, we report the results of comprehensive evaluations of environmentally relevant effects such as changes in pH, the presence of ions and temperature on the activity, three-dimensional structure and hydration shell of bacterial ice nucleators using ice affinity purification, high-throughput ice nucleation assays and surface-specific sum-frequency generation spectroscopy.

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