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Development and application of cryo-EM tools to study the ultrastructure of microbes in changing environments

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Stellingen

Propositions accompanying the thesis

Development and application of cryo-EM tools to study the ultrastructure of microbes in changing environments

1. Thin sample preparation for cryo-EM analysis can be easily and inexpensively expanded to less equipped labs using simplified, portable equipment. This thesis: Chapter 3 & 6
2. The specific conditions bacteria are exposed to inside a host can prime them for survival in the external environment. This thesis: Chapter 4
3. High resolution structural information can be obtained even after UVC inactivation of the pathogen in cryogenic conditions. This thesis: Chapter 5
4. Multicellular tissues continue to be a sample processing challenge for cryo-EM, but progress can be made using novel combinations of existing tools and innovative ideas. This thesis: Chapter 6
5. Laboratory strains are useful model systems for research but may not accurately represent what happens in the environment.
Stutzmann S & Blokesch M. (2016) mSphere. 1(3):1-10
6. Cryo-EM will continue to become more accessible and widely applied, eventually becoming the dominant structural biology technique.
Hand E. (2020) Science. doi: 10.1126/science.aba9954
7. Regardless of the microscope, sample preparation will always be the limiting factor for structural biology.
Hand E. (2020) Science. doi: 10.1126/science.aba9954

8. Cryo-EM should not be limited to well-funded labs, but should be an accessible tool for all researchers to advance science.

Stuart D, Subramaniam S, & Abrescia N. (2016) Nature Methods. 13(8):607-608

9. You can learn more by breaking something than you can by observing something that always works.
10. Continuous learning makes you a better scientist, and a better human.
11. To know how something works, it is often useful to look at it carefully.

Inspired by Stuart Howes

Jamie Scott Depelteau
Leiden, November 2021