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Abstract for an Invited Paper
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Proteome and cell biophysics on the back of an envelope¹

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We investigate the heterogeneity of several biophysical properties across the proteome, the entire set of proteins inside a cell. The global approach adopted here, in stark contrast to the traditional approach of one-protein-at-a-time, offers us insights to several foundational questions: 1) Why are cells so sensitive to temperature changes? How can the cell's maximum growth temperature be so close to the cell-death temperature? 2) What makes thermophiles withstand high temperature? 3) Why are cells so crowded? 4) What are the competitions between different physical processes inside a cell and their relative importance and evolutionary implications? Predictions are made using existing experimental data, protein knowledge bases, detailed simulations and simple theoretical calculations.

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