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Confinement due to crowding in biological cells

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The interior of biological cells corresponds to an environment, which is highly crowded. For instance, the total concentration of protein and RNA inside *Escherichia coli* is in the range 300–400 mg/mL [1]. Crowding can induce the confinement of molecular motions due to the restrictions in space. It is established that diffusion rates [2], but also activities, dynamics, aggregation or protein folding are influenced by crowding [1]. Here, we want to present new insights into the role of crowding and confinement with respect to extreme external conditions as low or high temperature, high hydrostatic pressure or salinity. Crowding influences the environmental viscosity, which in turn can provoke confinement on molecular dynamics. Both together have a protective effect against stress induced by extreme conditions. One possibility for such studies is to investigate cells, which are used to live under extreme conditions, in their intact form and after cell lysis to extract the limiting effects on the molecular dynamics of the proteome and of water molecules [3]. Other opportunities are the studies of proteins under (self-) crowding conditions [4].

References

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