The many ways of biosystems for coping with extreme conditions

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Life as we know it from our close environment corresponds to very narrow windows in external conditions, be it for temperature, pressure, pH, salinity or others. As they are suitable to the well-being of humans, we call them "normal". Nonetheless, a plethora of living systems cope with harsh conditions on Earth, in the oceans or the Earth crust and are well adapted to such conditions. Understanding their adaptation mechanisms gains more in more in importance to permit a better knowledge about the origin of life [1], modeling the impact of climate change on flora and fauna [2], establishing theoretical boundaries for life [3], and optimizing medical applications as thermal based treatments for cancer [4].

Neutron scattering is a well suited tool to disentangle various structural and dynamical elements allowing biosystems to withstand conditions hostile to life. Such studies can be combined with complementary laboratory methods and simulations for an in-depth picture. Based on research over the last years, we will present new insights into temperature [5, 6] and high hydrostatic pressure adaptation [7] (see figure below) and remind the impact of crowding and co-solutes [8] on biomolecular function especially under extreme conditions.

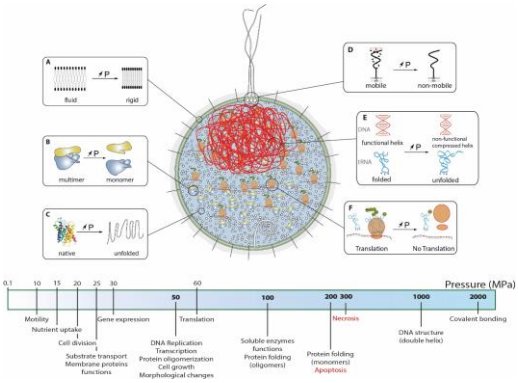

Figure : Impact of high pressure on cell components

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