

Analysis of radiation damage to the tardigrade Dsup protein by small angle X-ray scattering

Tuesday, 31 October 2023 16:00 (15 minutes)

The unique Dsup protein discovered in the tardigrade *Ramazzottius varieornatus* has been shown to increase resistance to radiation and oxidative stress in various model organisms, including human cell culture. The hypothesis suggests that Dsup forms a complex with DNA, which reduces damage caused by reactive oxygen species formed during water radiolysis. In order to understand the molecular mechanisms of radioprotection by Dsup protein and to develop applications of this protein, it is crucial to inspect the stability of Dsup to ionizing radiation. We investigated the susceptibility to degradation of Dsup and control bovine serum albumin (BSA) proteins exposed to γ -rays with doses up to 10 kGy. Combined study by small-angle X-ray scattering (SAXS) technique and polyacrylamide gel electrophoresis of proteins (SDS-PAGE) was performed. We demonstrate the Dsup protein is highly stable to the damage by ionizing radiation and, in particular, relatively to the control BSA.

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Session Classification: Life Science

Track Classification: Life Science