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## Thermal denaturation and aggregation of bovine serum albumin

**Borzova Vera Alexandrovna**  
Russian Academy of Sciences, Russia

Thermal aggregation of Bovine Serum Albumin (BSA) was studied at fixed temperatures (60 °C, 65°C, 70°C and 80°C) using Dynamic Light Scattering (DLS), asymmetric-flow field flow fractionation and Analytical Ultra-Centrifugation (AUC). Thermal denaturation of the protein was characterized by differential scanning calorimetry. Analysis of the experimental data allowed us to propose the mechanism of thermal aggregation of BSA. Protein unfolding results in the formation of three forms of the non-native protein with different propensity to aggregation. Highly reactive form ( $U_{hr}$ ) is characterized by a high rate of aggregation. Aggregation of  $U_{hr}$  leads to the formation of the primary aggregates. Lowly reactive form ( $U_{lr}$ ) possesses a low ability for self-aggregation. The  $U_{lr}$  form is able to participate in the aggregation process by attachment to the primary aggregates produced by the  $U_{hr}$  form. Non-reactive form ( $U_{nr}$ ) remains in the non-aggregated state during prolonged heating. The  $U_{nr}$  form was purified and characterized by fluorescent spectroscopy, AUC and DLS. Thermal aggregation of BSA was proposed as a test-system for quantification of the anti-aggregation activity of arginine and its derivatives. The dual effect of arginine derivatives on the initial rate of aggregation was observed. The determination of the order of aggregation with respect to the protein at 70°C shows that the rate-limiting state of the general process of BSA aggregation is the stage of aggregation of the denatured protein molecules. Thus, the observed effects of arginine and its derivatives demonstrate their direct action on the stage of aggregation.

### Biography

Borzova Vera Alexandrovna has completed her graduation from Moscow State University, Department of Biochemistry. She is working currently on her PhD thesis at A N Bach Institute of Biochemistry, Russian Academy of Sciences, Laboratory of Structural Biochemistry of Proteins, as a Research Scholar. She has published 4 papers in international journals with impact factor >3.

[squsiebox@gmail.com](mailto:squsiebox@gmail.com)

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