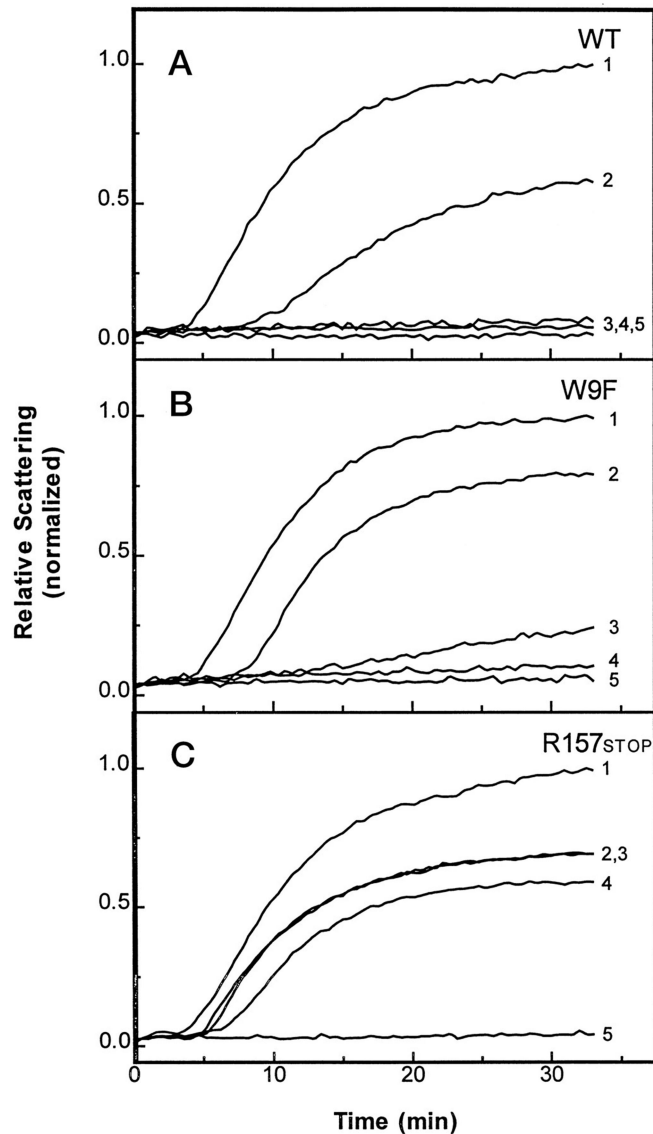


Eye lens protein α -crystallin and cataract - A Review

Sudipa Saha

Department of Biotechnology, St. Xavier's College (Autonomous), 30, Mother Teresa Sarani, Kolkata-700 016, India

Email: sudipa@sxccal.edu



Abstract: The lens is a transparent, biconvex structure in the eye that, along with the cornea, helps to refract light to be focused on the retina. Crystallins are water-soluble proteins that compose over 90% of the protein within the lens. The three main crystallin proteins found in the human eye lens are α -, β - and γ -crystallins. Crystallins tend to form soluble, high-molecular weight aggregates that pack tightly in lens fibers. α -Crystallin is the major structural protein and plays a dominant role in maintaining the transparency and

refractive properties of the eye lens. It consists of two highly homologous subunits α A- and α B-crystallin, having molecular mass ~20 kDa each. α -Crystallin belongs to the family of small heat shock proteins and acts as molecular chaperone by preventing stress-induced protein aggregation. With age, α -crystallin forms large aggregates and its ability to prevent aggregation is lost. So transparency of the lens is disturbed and cataract may result. Cataract is the opacity or clouding of lens in the eye which leads to a decrease in vision. Cataracts usually develop as the aging lens becomes more and more opaque, but cataracts can also form congenitally or after injury to the lens. Diabetes is a risk factor for cataract. Cataract is still one of the major causes of adult blindness. Extensive research is going on to prevent cataract. The development of nonsurgical treatments is crucial for preventing or reversing cataract. The nanotechnology offers the production of nanoparticles. Thus it can provide most suitable solutions for drug delivery to the eye. More and more research is necessary to approve these drugs to prevent cataract by nonsurgical method.

Keywords: Eye lens, α -crystallin, oligomeric structure, chaperone activity, denaturation, hydrophobic sites, cataract, mutation, glycation, deamidation.