INTRODUCTION

The crystalline lens is a biconvex, vascular, transparent structure enclosed by a capsule, a basement membrane secreted by the lens epithelium. The capsule, responsible for moulding the lens substance during accommodation, is thickest in the equatorial zone and thinnest at the posterior pole of the lens. The normal lens is transparent and any congenital or acquired opacity in the lens capsule or substance, irrespective of the effect on vision, is a cataract.

Cataract is the opacification of lens often associated with old age and is a major complication of diabetes mellitus because higher glycosylated haemoglobin levels are significantly associated with increased risk of cataract.

Cataract, opacity of the eye lens, is the leading cause of blindness worldwide. Nearly 19 million people are blind due to cataract in the world. The age-adjusted prevalence of cataract in India is three times that of the United States. Apart from aging, various risk factors such as nutritional deficiencies or inadequacies, diabetes, sunlight, environmental factors, smoking, and lack of consumption of antioxidants are known to increase the risk of cataract. Studies indicate that hyperglycemia and the duration of diabetes increases the risk of development is not fully understood, oxidative damage to the constituents of the eye lens is considered to be a major mechanism in the development of cataract

MAJOR TYPES OF Cataract

CLASSIFICATION:

A. Acquired cataract

1) Age-related cataract

2) Presenile cataract

3) Traumatic cataract

B. DRUG-INDUCED Cataract

Ex: Steroids, Gold, Chlorpromazine, Amiodarone, Allopurinol.

C. SECONDARY CATARACT
Epidemiology of cataract in India

Cataract remains the leading cause of visual disability and blindness all over the globe (Gupta et al., 1997a). The problem is more acute in the developing countries. It is estimated that there are about 12 million blind people in India alone due to cataract. Even though surgical removal of cataractous lens with the use of corrective lenses has helped and provide means to lessen the problem of vision loss, these procedures are expensive and not affordable for many in developing countries. Moreover, lack of resources such as medical expertise, equipment, supplies, etc. has limited the availability of corrective measures for cataract related blindness in many countries.

Cataract, a multi factorial disease occurs mainly due to the formation of large protein aggregates in the lens. It is due to the post translational modifications of lens crystalline such as oxidation, glycation, Schiff’s base formation, carbamylation, transamidation, phosphorylation and proteolysis leading to clouding of the lens. Hydration has been shown to be a common factor in development of sugar, microwave ionizing radiation, naphthalene mouse cataracts, triparanol and hereditary.

Risk factors

Risk factors are many for cataract development in humans. Aging is a prevalent risk factor in the development of cataracts. High incidences of cataracts have been observed in aged individuals. Apart from aging, genetic factors, nutrition, diarrhoea, diabetes, trace metals, ultraviolet radiation, glaucoma, hypertension, myopia, alcohol, and smoking have been implicated as significant risk factors in the causation of cataract.

Mechanisms associated with cataract

There are mainly two mechanisms involved in the development of cataract. Tryptophan which is an amino acid is present in eye lens in higher concentration. When it absorbs UV radiation, it forms N- Formyl Kynurenine. It may combine with the 3-OH Kynurenine and riboflavine which are lens photosensitizers, they absorb photons form the light and emits electrons. These electrons react with the molecular O₂ to form super oxide anion radical which
reacts with Na⁺ K⁺ ATPase pump in eye and may cause the swelling of the eye and cause lens opacification.

The other mechanism may be due to the oxidation of cysteine which is an aminoacid, resulting in the formation of the disulphide bond between the crystalline proteins which may produce insoluble aggregates which may cause lens opacification.