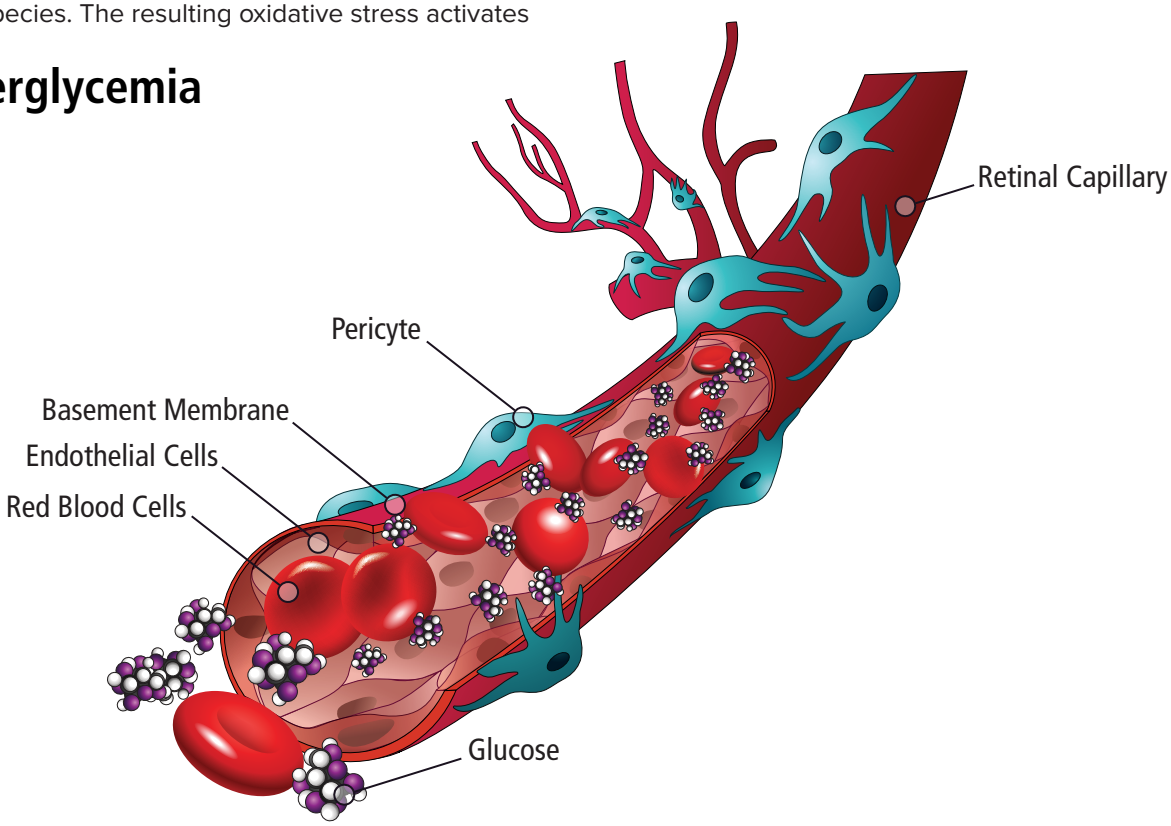
MODULE 6.2
Hyperglycemia

Hyperglycemia, or elevated blood glucose, is the initiating factor in the cascade of events that leads to vision loss in people with diabetes.[1] Clinical studies have confirmed a strong relationship between chronic hyperglycemia and the development and progression of diabetic retinopathy (DR).[2] Control of hyperglycemia is crucial in the management of diabetic eye disease: a 1% decrease in hemoglobin A1c (HbA1c) has been calculated to equate roughly to a 40% decrease in the risk of retinopathy, a 25% decrease in the risk of progression to vision-threatening retinopathy, a 25% decrease in the need for laser therapy, and a 15% decrease in the risk of blindness.[3]

Multiple hyperglycemia-induced metabolic abnormalities contribute to the pathogenesis of DR. Hyperglycemia increases the production of free radicals, or reactive oxygen species. The resulting oxidative stress activates four distinct glucose metabolic pathways: protein kinase C (PKC), advanced glycation end-products (AGEs), polyol (sorbitol), and hexosamine.[1,2,4,5] Another effect of hyperglycemia is an increase in glucose flux via the polyol pathway, in which glucose is converted into intracellular sorbitol by aldose reductase; this process may induce osmotic damage in retinal endothelial cells (ECs) and pericytes.

Production of vascular endothelial growth factor (VEGF) is also increased in hyperglycemia. Intraocular VEGF is strongly related to ocular manifestations of diabetes including retinal neovascularization, severity of DR, and diabetic macular edema (DME).[1]



References

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