
The Importance of Proteases in Eye Disease

W March

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Abstract

A meeting with Geert W. Schmid-Schonbein, a bioengineer at the University of California-San Diego, opened my eyes to the importance of proteases in major uncontrolled disease processes.

I had known about the prevalence and diversity of proteases, which are essential to the function of practically every organ in the body. I had also heard about new clinical trials of metalloprotease inhibitors (MMPI) for cancer and heart disease. However, I did not consider the potential importance of these inhibitors in eye disease until Dr. Schmid-Schonbein, who began by studying the movement mechanics of white blood cells (WBC) in the microcirculation. He and his research group noted an accumulation of WBC in diabetic retinopathy and stroke, just like they had seen previously in the myocardium. His group discovered that these WBC had upregulated proteases that are causing destruction in these disease processes. As a result, a whole new field of pursuit began in the treatment of diabetic retinopathy and Dr. Schmid-Schonbein was a guest lecturer at ARVO.

More recently he and his coworkers demonstrated in animals that much of the destruction and death from shock is due to

the liberation of the huge amounts of digestive proteases in the gastrointestinal track with self-digestion of the intestinal wall. Blockade of the digestive enzymes in the lumen of the small intestine of animals provides a significant protection against WBC activation and acute multi-organ-failure in shock. He currently awaits a physician who is willing to begin a clinical trial of protease inhibitors in acute shock.

The eye maintains a delicate balance of protease activity in the trabecular meshwork and the retina. Protease activity is essential to aqueous outflow and argon laser trabeculoplasty has been shown by Michael Van Buskirk to activate protease activity and increase outflow. J. O'Tousa showed that protease contributes to cell death in retinal regeneration such as macular degeneration. More than one group of proteases are involved and specific inhibition is complicated. However, this area of investigation deserves more attention and credit should be paid to innovators like Dr. Schmid-Schonbein, who have shown the light on the dark corners of eye disease.

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References

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