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RETINAL CHANGES IN THE COHEN-ROSENTHAL DIABETIC (NON-INSULIN-DEPENDENT) HYPERTENSIVE RAT MODEL.
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Objective: To study the retinal changes in the Cohen-Rosenthal Diabetic (Non-Insulin-Dependent) Hypertensive Rat Model (CRDH), a spontaneously diabetic, hypertensive strain with nephropathy and cardiomyopathy.

Methods: The retinas of CRDH rats, Cohen diabetic rats (CDR) and normal Wistar Kyoto (WKY) rats were compared at 1, 3, 6 and 18 months. Morphological analysis was done by light microscopy and retrograde labeling of retinal ganglion cells with lipophilic neurotracer dye.

Results: Light microscopy of the retinal sections from 3-month-old CRDH rats demonstrated reduction in the thickness of the outer plexiform and outer nuclear layers compared to age-matched WKY rats. Retinal degeneration increased progressively in the CRDH retinas at 6 and 18 months, at which times the retinas were thinner, the outer nuclear layer was extensively atrophic, the outer plexiform layer was more extensive or missing, and the number of surviving ganglion cells evidenced by retrograde labeling was markedly reduced. These findings clearly progressed with age, and were more extensive in 18-month-old rats than in younger rats. Similar but less severe retinal changes were found in the CDR rats than in age-matched CRDH rats. There were no abnormal findings in the retinal structures of 1-month-old rats of any group, or in the WKY rats of all ages.

Conclusions: There is an accelerated rate of retinal neurodegeneration in diabetic rats of these specific species. These changes are more extensive in the genetically diabetic hypertensive rat strain (CRDH) than in the isolated diabetes model (CDR) and the normal rats (WKY). Diabetic retinal changes in the CRDH rat model are accelerated by hypertension.

Fig 1. Whole-mounted retina with retrogradely labeled ganglion cells. A) Diabetic hypertensive rat, 18 months old; B) normal rat, same age.

Fig 2. Whole-mounted retina with retrogradely labeled ganglion cells. A) Diabetic hypertensive rat, 6 months old; B) normal rat, same age.

Key Words: Diabetic Hypertensive Rats, Retinal Neurodegeneration,