

## Effect of para-aminobenzoic acid on the course of retinal degeneration in the rd10 mouse.

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### Abstract

#### PURPOSE:

Recent evidence suggests that oxidative injury plays a significant role in the pathogenesis of retinal degenerative diseases. Para-aminobenzoic acid (PABA) is a cyclic amino acid, which may act to decrease lipid peroxidation and oxidative injury. Our aim was to evaluate the efficacy of PABA in attenuating oxidative injury and rate of retinal degeneration in the rd10 mouse.

#### METHODS:

PABA (50 mg/kg) was administered intraperitoneally six times per week in 28 rd10 mice from postnatal day 3. Twenty-four littermate control mice were similarly injected with saline. At 3, 4.5, and 6 weeks of age, electrophysiological (full field electroretinogram-ERG), quantitative histological, and immunohistochemical techniques were used to assess the course and extent of retinal degeneration. Degree of lipid peroxidation was determined by the measurement of thiobarbituric acid reactive species (TBARS) and retinal carbonyl content was quantified using the 2,4-dinitrophenylhydrazine method.

#### RESULTS:

Dark adapted mixed rod-cone ERG responses at 3 weeks of age were higher in the PABA-treated group as compared to saline control ( $P < 0.05$ ). By 4.5 weeks, this protective effect was largely abolished and by 6 weeks ERG was unrecordable in both groups. However, at both 3 and 4.5 weeks of age, light-adapted cone ERG amplitudes were better preserved in PABA-treated animals. At 4.5 weeks, thickness of the outer nuclear layer was 28.6% higher in the peripheral retina of PABA-treated mice as compared to controls ( $P < 0.05$ ). Quantitative immunohistochemistry revealed 2.4-fold higher red/green cone opsin content in the retinas of PABA-treated mice ( $P < 0.005$ ). At both 3 and 4.5 weeks, levels of TBARS and protein carbonyls were 49%-69% lower in PABA-treated retinas ( $P < 0.05-0.0005$ ), suggesting less oxidative injury.

#### CONCLUSIONS:

PABA treatment may protect retinal function and attenuate the course of retinal degeneration in rd10 mice. Biochemical parameters indicate a lower degree of oxidative injury in PABA-treated retinas. PABA may potentially serve as an addition to antioxidative treatment for retinal and macular degenerations