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Inhibition of mTOR pathway to prevent photoreceptor cell damage**Umur Kayabasi**

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Introduction: mTOR is a cytoplasmic kinase that regulates cell growth and metabolism in response to mitogens [such as IGF-I and Vascular Endothelial Growth Factor (VEGF)], nutrients (amino acids, glucose and fatty acids), hormones including insulin and cytokines. This pathway is essential for development and growth of the young organism. But later in life, when growth has been completed, mTOR drives cellular and organismal aging by acquiring pro-inflammatory and signal resistant characteristics. mTOR pathway also takes part in retinal degenerative diseases.

Method: 10 patients with mid stage Retinitis Pigmentosa (RP) were treated by intravitreal Rapamycin and oral Metformin plus Resveratrol for 6 months. 10 other RP patients were given placebo. The average age of the patients was 28. After 1 year, change in visual acuity and Visual Fields (VF) was recorded.

Result: Difference in change in visual acuity did not reach a significant statistical result between the two groups whilst the visual fields were either protected or slightly improved in the treatment group. The difference in mean deviation before and after 1 year follow up between the two groups was statistically significant. ($P=0.001$) VF deteriorated in the placebo group but was preserved in the treatment group.

Conclusion: Inhibition of mTOR maintains cellular proteostasis and attenuates oxidative stress by reducing misfolded protein synthesis and augmenting autophagy to remove misfolded proteins caused by gene mutations. The combination of Rapamycin, Metformin and Resveratrol may help to stabilize VF loss in hereditary retinal diseases.

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