WHAT IS CLAIMED IS:

1. Use of a therapeutically effective amount of an Adeno-associated virus (AAV) vector comprising a sequence encoding human NMNAT1, operably linked to a promoter that drives expression in retinal cells, preferably in photoreceptors in the manufacture of a medicament for treating retinal degeneration caused by mutations in a nicotinamide mononucleotide adenylyltransferase 1 (*NMNAT1*) gene in a human subject.

2. The use of claim 1 wherein the promoter is a CAG, CASI, CMV, RHO, or rhodopsin kinase (GRK1) promotor.

3. The use of claim 2, wherein the NMNAT1-encoding sequence is at least 80% identical to a wild type (SEQ ID NO:2) or codon optimized (SEQ ID NO:1) sequence.

4. The use of claims 1-3, wherein the vector is delivered via sub-retinal injection.

5. An Adeno-associated virus type 2 (AAV2) vector comprising a sequence encoding human NMNAT1, operably linked to a promotor that drives expression in the retina, preferably in the photoreceptor cells.

6. The vector of claim 5, wherein the promotor is a CAG, CASI, CMV, RHO, or rhodopsin kinase (GRK1) promotor.

7. The vector of claim 5, wherein the NMNAT1sequence is codon optimized.

8. A pharmaceutical composition comprising the vector of claims 5-7, formulated for delivery via sub-retinal injection.

9. The vector of claims 5-7, for use in treating retinal degeneration caused by mutations in NMNAT1 in the eye of a human subject.

10. The vector of claims 5-7, for use in increasing expression of NMNAT1 in the eye of a human subject.

11. The pharmaceutical composition of claim 8, for use in treating retinal degeneration caused by mutations in NMNAT1 in the eye of a human subject.

12. The pharmaceutical composition of claim 8, for use in increasing expression of NMNAT1in the eye of a human subject.