RGS9BP gene
regulator of G protein signaling 9 binding protein

Normal Function
The *RGS9BP* gene (which is also known as *R9AP*) provides instructions for making a protein called RGS9 binding protein. This protein is found in the retina, which is the specialized tissue at the back of the eye that detects light and color. Within the retina, the protein is associated with light-detecting cells called photoreceptors. As its name suggests, RGS9 binding protein interacts with a protein called RGS9 (which is produced from the *RGS9* gene). It anchors the RGS9 protein to photoreceptors and stimulates RGS9's activity.

When light enters the eye, it stimulates specialized pigments in photoreceptor cells. This stimulation triggers a series of chemical reactions that produce an electrical signal, which is interpreted by the brain as vision. (This process is known as phototransduction.) Once photoreceptors have been stimulated by light, they must return to their resting state before they can be stimulated again. RGS9 and RGS9 binding protein are involved in a chemical reaction that helps return photoreceptors to their resting state quickly after light exposure.

Health Conditions Related to Genetic Changes

**Bradyopsia**
At least six mutations in the *RGS9BP* gene have been found to cause bradyopsia, a rare condition that affects vision. In people with bradyopsia, the eyes adapt more slowly than usual to changing light conditions (for example, walking out of a darkened movie theater into daylight or driving into a dark tunnel on a sunny day). Some affected individuals also have difficulty seeing small moving objects, such as a tennis ball.

The *RGS9BP* gene mutations that cause bradyopsia prevent RGS9 binding protein from anchoring the RGS9 protein to photoreceptor cells. The resulting loss of RGS9 protein function prevents photoreceptors from recovering quickly after responding to light. Normally they return to their resting state in a fraction of a second, but in people with *RGS9BP* gene mutations, it can take ten seconds or longer. During that time, the photoreceptors cannot respond to light. This delay causes temporary blindness in response to changing light conditions and may interfere with seeing small objects when they are in motion.
**Chromosomal Location**

Cytogenetic Location: 19q13.11, which is the long (q) arm of chromosome 19 at position 13.11

Molecular Location: base pairs 32,675,848 to 32,678,300 on chromosome 19 (Homo sapiens Updated Annotation Release 109.20190905, GRCh38.p13) (NCBI)

Credit: Genome Decoration Page/NCBI

**Other Names for This Gene**

- FLJ45744
- R9AP
- regulator of G-protein signaling 9-binding protein
- regulator of G-protein signaling 9 binding protein
- RGS9 anchor protein
- RGS9-anchoring protein

**Additional Information & Resources**

**Educational Resources**

  https://www.ncbi.nlm.nih.gov/books/NBK52768/

  https://www.ncbi.nlm.nih.gov/books/NBK11522/

**Scientific Articles on PubMed**

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28RGS9BP%5BTIAB%5D%29+OR+%28R9AP%5BTIAB%5D%29+AND+english%5Bla%5D+AND+human%5Bmh%5D
Catalog of Genes and Diseases from OMIM

- REGULATOR OF G PROTEIN SIGNALING 9-BINDING PROTEIN
  http://omim.org/entry/607814

Research Resources

- ClinVar

- HGNC Gene Symbol Report

- Monarch Initiative
  https://monarchinitiative.org/gene/NCBIGene:388531

- NCBI Gene

- UniProt
  https://www.uniprot.org/uniprot/Q6ZS82

Sources for This Summary

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/17698770

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/19818506

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/14702087

- OMIM: REGULATOR OF G PROTEIN SIGNALING 9-BINDING PROTEIN
  http://omim.org/entry/607814

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