

## MAGT1 gene

magnesium transporter 1

### Normal Function

The *MAGT1* gene provides instructions for making a protein called a magnesium transporter, which moves charged atoms (ions) of magnesium ( $Mg^{2+}$ ) into certain immune system cells called T cells. T cells recognize foreign invaders, such as viruses, bacteria, and fungi, and are then turned on (activated) to attack these invaders in order to prevent infection and illness. Specifically, the magnesium transporter produced from the *MAGT1* gene is active in CD8+ T cells, which are especially important in controlling viral infections such as the Epstein-Barr virus (EBV). These cells normally take in magnesium when they detect a foreign invader, and the magnesium is involved in activating the T cell's response.

Researchers suggest that magnesium transport may also be involved in the production of another type of T cell called helper T cells (CD4+ T cells) in a gland called the thymus. CD4+ T cells direct and assist the functions of the immune system by influencing the activities of other immune system cells.

### Health Conditions Related to Genetic Changes

X-linked immunodeficiency with magnesium defect, Epstein-Barr virus infection, and neoplasia

At least five *MAGT1* gene mutations that cause X-linked immunodeficiency with magnesium defect, Epstein-Barr virus infection, and neoplasia (typically known by the acronym XMEN) have been identified. XMEN is a disorder that affects the immune system in males. It involves chronic EBV infection and an increased risk of a cancer of immune system cells called lymphoma. The word "neoplasia" in the condition name refers to these lymphomas; neoplasia is a general term meaning abnormal growths of tissue.

*MAGT1* gene mutations impair the magnesium transporter's function, reducing the amount of magnesium that gets into T cells. This magnesium deficiency prevents the efficient activation of the T cells to target EBV and other infections. Uncontrolled EBV infection increases the likelihood of developing lymphoma. Impaired production of CD4+ T cells resulting from abnormal magnesium transport likely accounts for the deficiency of this type of T cell in individuals with XMEN, contributing to the decreased ability to

prevent infection and illness.

### Autoimmune lymphoproliferative syndrome

MedlinePlus Genetics provides information about Autoimmune lymphoproliferative syndrome

### **Other Names for This Gene**

- bA217H1.1
- DKFZp564K142
- IAP
- implantation-associated protein
- magnesium transporter protein 1
- MRX95
- oligosaccharyltransferase 3 homolog B
- OST3B
- PRO0756
- XMEN

### **Additional Information & Resources**

#### Tests Listed in the Genetic Testing Registry

- Tests of MAGT1 ([https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=84061\[geneid\]](https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=84061[geneid]))

#### Scientific Articles on PubMed

- PubMed (<https://pubmed.ncbi.nlm.nih.gov/?term=%28MAGT1%5BTIAB%5D%29+OR+%28%28XMEN%5BTIAB%5D%29+OR+%28implantation-associated+protein%5BTIAB%5D%29%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D%29>)

#### Catalog of Genes and Diseases from OMIM

- MAGNESIUM TRANSPORTER 1; MAGT1 (<https://omim.org/entry/300715>)

#### Gene and Variant Databases

- NCBI Gene (<https://www.ncbi.nlm.nih.gov/gene/84061>)
- ClinVar ([https://www.ncbi.nlm.nih.gov/clinvar?term=MAGT1\[gene\]](https://www.ncbi.nlm.nih.gov/clinvar?term=MAGT1[gene]))

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## Genomic Location

The *MAGT1* gene is found on the X chromosome (<https://medlineplus.gov/genetics/chromosome/x/>).

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