AIP Gene

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aryl hydrocarbon receptor interacting protein

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1. Normal Function

The *AIP* gene provides instructions for making a protein called aryl hydrocarbon receptor-interacting protein (AIP). Although AIP's function is not well understood, it is known to interact with numerous other proteins, including one called the aryl hydrocarbon receptor. Through these interactions, AIP likely helps regulate certain cell processes, such as the growth and division (proliferation) of cells, the process by which cells mature to carry out specific functions (differentiation), and cell survival. This protein is thought to act as a tumor suppressor, which means it normally helps prevent cells from proliferating in an uncontrolled way.

2. Health Conditions Related to Genetic Changes

2.1 Familial isolated pituitary adenoma

Mutations in the *AIP* gene cause 15 to 25 percent of cases of familial isolated pituitary adenoma (FIPA), an inherited condition characterized by development of a noncancerous tumor in the pituitary gland (called a pituitary adenoma). This small gland at the base of the brain produces hormones that control many important body functions. There are several types of pituitary adenomas categorized by the hormone they produce. Affected individuals within the same family may develop the same type of pituitary adenoma or different types. People with a mutation in the *AIP* gene most commonly develop a type of pituitary adenoma called a somatotropinoma. FIPA tumors caused by *AIP* gene mutations usually occur at a younger age and are larger than those without *AIP* gene mutations.

Many kinds of mutations in the *AIP* gene have been identified in affected families. Some of these changes lead to an abnormally short protein or no protein at all. Other mutations change single protein building blocks (amino acids) in AIP. Although it is unclear how these mutations are involved in tumor development, researchers believe that the alterations disrupt interaction between AIP and one or more other proteins. The ability of AIP to control cell proliferation may be reduced, allowing pituitary cells to grow and divide unchecked and form a tumor. It is not known why the pituitary gland is specifically affected or why certain types of pituitary adenomas develop.

Even before FIPA was defined as a condition, doctors recognized that somatotropinomas could occur in multiple members of a family. They referred to these tumors as isolated familial somatotropinoma. These tumors produce and release excess growth hormone (also called somatotropin), which promotes growth of the body. Because it can cause overgrowth of the hands, feet, and face (acromegaly), the condition is also referred to as familial isolated acromegaly. Later, researchers discovered that isolated familial somatotropinoma can be caused by mutations in the *AIP* gene, and these tumors are now considered part of FIPA.

2.2 Other disorders

Mutations in the *AIP* gene are found in a small percentage of individuals with sporadic macroadenomas, which are large (macro-) pituitary adenomas that occur in individuals with no history of the condition in their family. When caused by *AIP* gene mutations, the tumors occur at a relatively young age, usually before age 30. Although other family members are not affected, the gene mutation is often inherited from a parent who never developed an adenoma.

3. Other Names for This Gene

- AH receptor-interacting protein

- AIP_HUMAN
- ARA9
- FKBP16
- FKBP37
- HBV X-associated protein 2
- immunophilin homolog ARA9
- SMTPHN
- XAP-2
- XAP2

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