NFKBIA Gene

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NFKB inhibitor alpha

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1. Introduction

The *NFKBIA* gene provides instructions for making one piece (the alpha subunit) of the IKK protein complex, which is a group of related proteins that regulates the activity of nuclear factor-kappa-B. Nuclear factor-kappa-B is a protein complex that binds to DNA and controls the activity of other genes. When it is turned off (inactive), nuclear factor-kappa-B is attached (bound) to the IKK complex. In response to certain signals, the IKK complex turns on (activates) nuclear factor-kappa-B and releases it.

The NFKBIA protein helps keep nuclear factor-kappa-B bound in the IKK complex. When the NFKBIA protein receives a signal that nuclear factor-kappa-B is to be released, it breaks down so the factor can be turned on (activated) and released from the complex. Once the active factor is released, it moves into the nucleus and binds to DNA. Nuclear factor-kappa-B regulates the activity of multiple genes, including genes that control the body's immune responses and inflammatory reactions. Nuclear factor-kappa-B also appears to play a role in the signaling pathway that is critical for the formation of ectodermal tissues including the skin, hair, teeth, and sweat glands. In addition, it protects the cell from certain signals that would otherwise cause it to self-destruct (undergo apoptosis).

2. Health Conditions Related to Genetic Changes

2.1. Anhidrotic ectodermal dysplasia with immune deficiency

At least five mutations in the *NFKBIA* gene have been found to cause anhidrotic ectodermal dysplasia with immune deficiency (EDA-ID). EDA-ID is a condition characterized by reduced function of the immune system, resulting in recurrent infections, and abnormal development of ectodermal tissues. The *NFKBIA* gene mutations that cause EDA-ID impair the protein's breakdown. As a result, nuclear factor-kappa-B is not activated or released from the IKK complex. Without nuclear factor-kappa-B available in the nucleus to regulate gene activity, certain signaling pathways within immune cells and cells that form ectodermal tissues are disrupted, resulting in immune deficiency and incomplete development of tissues of the ectoderm as occurs in individuals with EDA-ID.

3. Other Names for This Gene

- I-kappa-B-alpha
- IkappaBalpha
- ikB-alpha
- IKBA
- IKBA_HUMAN
- MAD-3
- major histocompatibility complex enhancer-binding protein MAD3
- NF-kappa-B inhibitor alpha
- NFKBI
- nuclear factor of kappa light chain gene enhancer in B-cells
- nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, alpha

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