

Difference Between IgG and IgE

www.differencebetween.com

Key Difference - IgG vs IgE

Immunoglobulins are a type of globular proteins with a complex structure which are produced by the living system as a secondary specific immune response upon contacting with a foreign particle or a pathogenic organism. Immunoglobulins are also known as antibodies or specific proteins produced in response to an antigen. These proteins are circulatory proteins found, and there are five main types of them which are produced at different sites of the system in response to different stimulants. The main five classes are immunoglobulin (Ig) A, G, M, E and D. The key difference between IgG and IgE is that **IgG is primarily involved in fighting against pathogenic viral and bacterial strains and are produced in response to specific antigens present in virus or bacteria whereas Immunoglobulin E (IgE) is produced as an allergic response to common allergens such as pollen, dust or certain food or medications.**

What is Ig G?

IgG is the most common type of immunoglobulin present in living systems. It is the main form of circulatory immunoglobulin in the body and is the only form of immunoglobulin that can cross the placenta and reach the fetus. IgG has four major subclasses due to its wide functions: IgG1, IgG2, IgG3, and IgG4.

IgG consists of four polypeptide chains – 2 heavy chains and 2 light chains, which are linked together by inter-chain disulfide linkages. Each heavy chain consists of an N-terminal variable domain (VH) and three constant domains (CH1, CH2, CH3), with an additional “hinge region” between CH1 and CH2. Each light chain consists of an N-terminal variable domain (VL) and a constant domain (CL). The light chain interacts with the VH and CH1 domains to form a Fab arm (“Fab” = fragment antigen binding); functionally, the V regions interact to form the antigen-binding region. Furthermore, IgG also contains a highly conserved region which contains a glycosylated amino acid at the 297th position.

Anatomy of an IgG

(residue numberings are approximate)

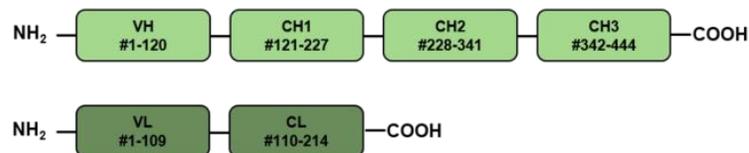
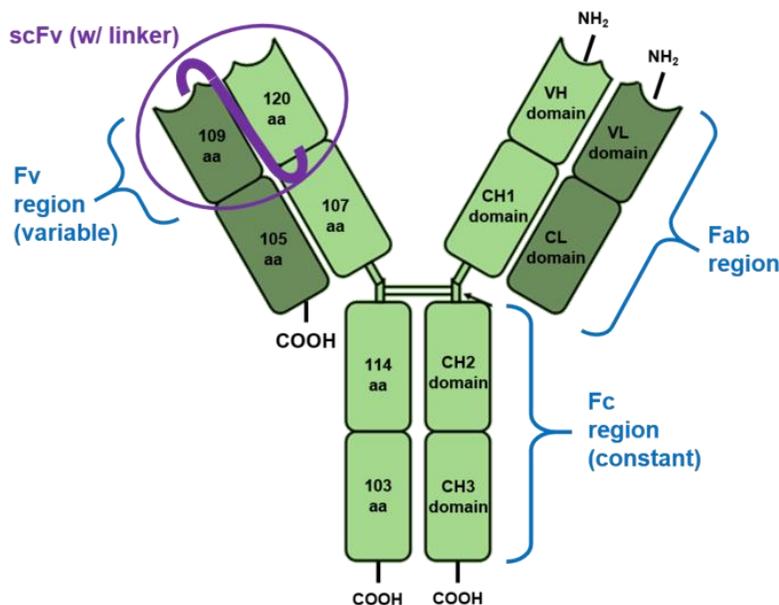


Figure 01: General structure of IgG

Different IgG Classes

IgG1

IgG1 is the most abundant subclass and is the immediate antibody response produced in the body upon infection by a bacterial or a viral agent. Therefore, deficiencies in IgG1 can lead to secondary antibody decrease and can lead to developing immune compromised situations which will result in the development of recurrent diseases.

IgG2

These are produced mainly in response to bacterial capsular antigens. These antibodies respond to carbohydrate based antigens.

IgG3

This is a potent proinflammatory antibody which is generally produced in response to a viral infection. The antibodies produced in response to blood group antigens also belong to this class.

IgG4

This class of antibodies are produced in response to prolong infections and may be produced in response to the proteins produced during the infection.

What is IgE?

IgE is a globular protein produced as a secondary immune mechanism in response to allergens and allergic responses such as dust, pollen, certain food, and medicine. IgE is commonly found in the mucous secreting areas of the respiratory system, in the skin and in immune cells such as mast cells, basophils, and macrophages. The main result of an IgE response is a hypersensitivity reaction.

IgE can either be allergic specific Immunoglobulins or non-allergic specific immunoglobulins or exist in minor quantities in the serum. IgE secretions are commonly observed in allergic reactions which include inhalation of pollen dust or ingestion of allergen containing food substances. In response to allergic reactions, it increases the secretion of histamines and cytokines which increases vascular permeability and smooth muscle contraction, resulting in many of the symptoms.

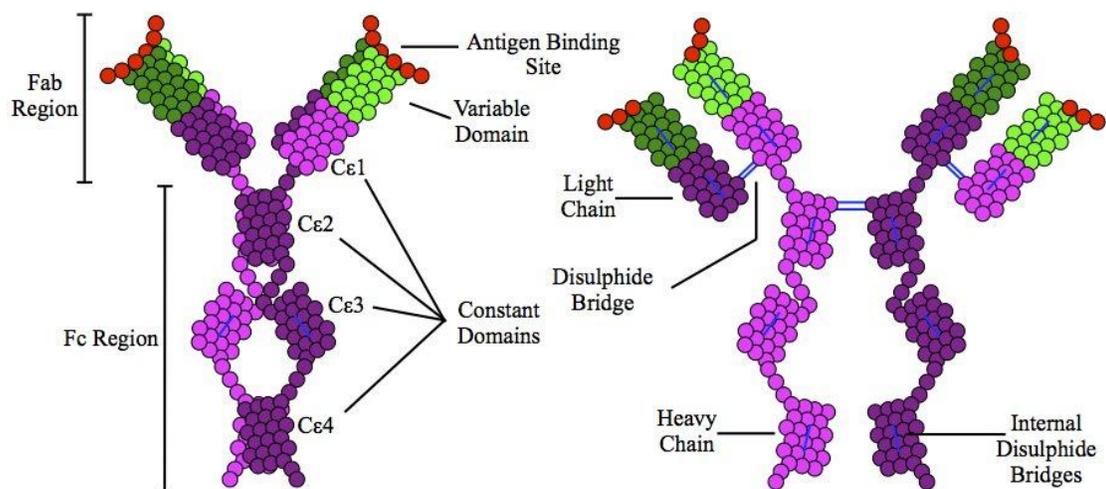


Figure 02: General structure of IgE

What are the similarities between IgG and IgE?

- IgG and IgE produce secondary immune responses.
- They are highly specific.
- Both antibodies consist of four polypeptide chains; 2 heavy chains and 2 light chains.

What is the difference between IgG and IgE?

IgG vs IgE	
IgG is produced as a secondary immune mechanism involved in fighting against pathogenic viral and bacterial strains.	IgE is produced as a secondary immune mechanism in response to allergens and allergic responses.
Abundance	
IgG is highly abundant (serum concentration 10-15mg/ml).	IgE is less abundant (serum concentration 10 – 400ng/ml).
Distribution	
IgG is distributed in all intra and extra vascular tissues.	IgE is distributed in mucus secreting cells, mast cells, basophils, macrophages.
Immune Response	
IgG reacts in response to bacteria or virus.	IgE reacts in response to allergens.
Onset of the Response	
Response is delayed in IgG.	Response is rapid in IgE.
Duration of the Response	
IgG response is prolonged.	IgE response is brief.
Persistence of the Antibody	

IgGs are lifelong.

IgE persists for only a few months.

Ability to Cross the Placenta

IgG can cross the placenta.

IgE cannot cross the placenta.

Summary – IgG vs IgE

Immunoglobulins are antibodies in our blood. They are large Y shaped proteins which act against antigens. There are five types of immunoglobulins. IgG and IgE are two types of immunoglobulins. Both IgG and IgE are produced in the body as a secondary immune response. The main difference between IgG and IgE is that IgG reacts in response to bacteria or virus while IgE reacts in response to allergens. They are specific antibodies which act by binding to a specific antigen and forming an antibody antigen complex which is involved in bringing about the action. Both IgG and IgE blood testing are very important diagnostic tools that can provide an essential blueprint for immune system improvement.

References:

1. Amarasekera, M. “Immunoglobulin E in health and disease.” Asia Pacific Allergy, Asia Pacific Association of Allergy, Asthma and Clinical Immunology, Apr. 2011, [Available here](#). Accessed 30 Aug. 2017.
2. “Immunoglobulin Structure and Classes.” Thermo Fisher Scientific, [Available here](#). Accessed 30 Aug. 2017.
3. Vidarsson, Gestur, et al. “IgG Subclasses and Allotypes: From Structure to Effector Functions.” Frontiers in Immunology, Frontiers Media S.A., 2014, [Available here](#). Accessed 30 Aug. 2017.

Image Courtesy:

1. “Anatomy of an IgG” By w>User:AJVincelli – Created by Wikipedia w>User:AJVincelli using PowerPoint 2013 and multiple public reference sources. (Public Domain) via [Commons Wikimedia](#)
2. “IgE” By SariSabban – Sabban, Sari (2011) Development of an in vitro model system for studying the interaction of Equus caballus IgE with its high- affinity FcεRI receptor (PhD thesis), The University of Sheffield ([CC BY-SA 3.0](#)) via [Commons Wikimedia](#)

How to Cite this Article?

APA: Difference Between IgG and IgE. (2017, September 06). Retrieved (date), from <http://differencebetween.com/difference-between-igg-and-vs-ige>

MLA: " Difference Between IgG and IgE " *Difference Between.Com*. 06 September 2017. Web.

Chicago: "Difference Between IgG and IgE." *Difference Between.Com*.
<http://differencebetween.com/difference-between-igg-and-vs-ige/> accessed (accessed [date]).



Copyright © 2010-2017 Difference Between. All rights reserved