Immune Globulin

Understanding the Science and Manufacturing Journey from Plasma Donor to Patient

ADMA BIOLOGICS

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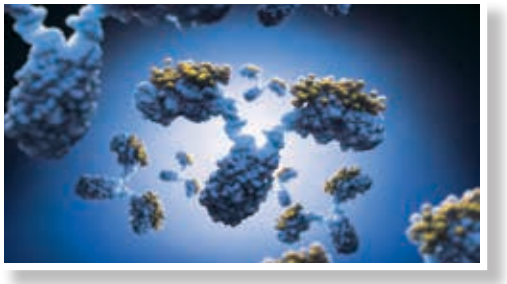
IMMUNE GLOBULIN IS ESSENTIAL TO LIFE

Immune globulin (Ig) plays a critical role in the function of the immune system.

Ig is activated during the body's response to an infection, presented as an antigen. Without Ig, our bodies cannot fight off infections and loses certain abilities to regulate other parts of the immune system.[1,2]

Ig contains **antibodies,** which are large Y-shaped proteins that are critical to combating a range of pathogens, such as bacteria, viruses, and fungi.[1,2]



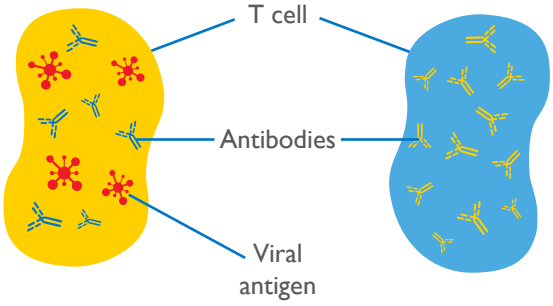
Antibodies are integral to the immune response.

Antibodies in Ig can develop in two distinct ways:

❶ **A natural infection triggers an immune response.** Patients who convalesce – recover from an illness or an operation – may have plasma that contains antibodies against specific pathogens, thus protecting the patient from re-infection.[3]

❷ **Vaccines are designed** to generate an immune response that produces antibodies to a specific antigen. Vaccines contain biological product that might mimic a disease-bearing microorganism or some other protein to trigger antibody production.[3]

Transfer of antibodies from convalescent patients or immunized donors generates active immunity



Vaccine–mediated active immunity is achieved by administering living or attenuated pathogens

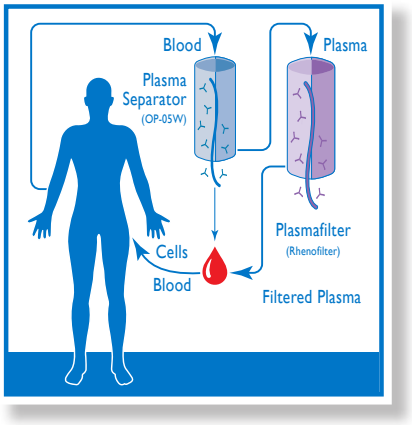
Patients who are unable to generate a protective immune response to infection or vaccination require passive immunity. Immune globulin is the only way to provide this passive immunity to protect people from infectious diseases.[4]

IMMUNE GLOBULIN PRODUCTION STARTS WITH SOURCE PLASMA DONATIONS

The path to producing immune globulin starts at the source with plasma obtained from donors. Human donors have blood plasma that may already contain a range of polyclonal antibodies that fight a wide array of diseases and infections.[4,5]

Plasma is the liquid component of blood comprising ~90% water and 10% proteins, one of which is Ig. Plasma is collected and obtained from donors using a process called **plasmapheresis.**

- During this process, plasma is separated from blood cells.
- Plasma collection is performed at an FDA-compliant donation site.[6]



The plasmapherisis process.

Certain plasma donations may contain rare and unique antibody characteristics[7]

The type of plasma used in immune globulin manufacturing can determine the level of antibody to specific pathogens.[6,7]

Once plasma is collected from donors, it may be analyzed to identify certain titers – a measure of concentration – for specific antibodies to different infectious diseases.

- Certain specific producers of Ig may produce hyperimmune Ig, which consistently provides a defined antibody titer level to a specific infectious disease.
- ADMA uses a patented and FDA-approved process to manufacture a novel Ig with a unique antibody that is tested to meet the FDA-required and defined potency to measles, polio, and diphtheria, as well as in-process defined antibody titers to respiratory syncytial virus and other respiratory viral pathogens.[8,9]

The plasma donor pool matters because the type of plasma composition used for immune globulin production determines the level of antibody in the final product to specific pathogens.[7]

OUR PROCESS ENSURES QUALITY AND CONSISTENCY FROM DONOR TO PATIENT

The manufacturing journey follows FDA requirements and ADMA's rigorous standards to meet specified safety and quality measures[9]

Understanding the unique composition and manufacturing of Ig can help guide treatment decision-making for appropriate patients.[10]

IMMUNE GLOBULIN PRODUCTS VARY BY COMPOSITION

Ig is prepared in different formulations that can be administered by intramuscular (IM), intravenous (IV), and subcutaneous (SC) routes.[10]

- IV administration of Ig, or IVIG, provides its antibodies and other properties directly into the bloodstream with immediate availability of its medicinal properties. The half-life of IVIG in the body is typically 21-28 days.[10] IV is the traditional route for standard immune globulin and specific hyperimmune globulin products.
- IM administration is typically used for hyperimmune globulin and is injected into the muscle of a patient. The half-life of some IM formulations may reach 23 days, with 2 days post administration for blood concentration to reach peak levels.[11]
- Typically, SC administration requires a larger immune globulin dose to achieve a pharmacokinetic profile similar to that of IVIG.[10]

Polyclonal

Polyclonal Ig requires source plasma from more than 1,000 unique donors; these donors must carry antibodies against measles, tetanus, and diphtheria, commonly regarded as the antibody repertoire of the human species.*

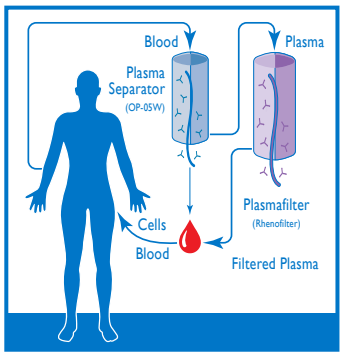
Hyperimmune

Hyperimmune globulin contains standardized sufficient levels of titers to specific antigens or against specific infectious disease but does not have a minimum number of donor plasma unit requirement.

*IVIG is manufactured in accordance with 21CFR640

ADMA HAS DEVELOPED A PATENTED PROCESS TO MANUFACTURE A UNIQUE POLYCLONAL GLOBULIN

Our immune globulin production process is driven by the unique composition of blending hyperimmune and normal source plasma.



Plasma collection

Donors undergo plasmapheresis to separate blood plasma and return blood circulation.

Source plasma screening and identification

Donated plasma is then tested using ADMA's proprietary assay to identify which units contain sufficient levels of naturally occurring neutralizing antibodies to RSV. The plasma pool is derived from blending normal source plasma with RSV-tested plasma of a minimum pool of 1,000 donors in order to comply with FDA CFR requirements.[8]

IVIG production

Our products are manufactured using our FDA-approved process to ensure the highest quality immune globulin in every vial.[8]

QUALITY INSIDE EVERY VIAL[9]

ADMA uses a patented and FDA-approved process for donor screening and plasma pooling that meets FDA potency criteria (21CFR640.104).

*ADMA Biologics patents issued 9,107,906 - 9,714,283 - 9,815,886.

- ✓ Code of Federal Regulations (21CFR640) requirements of a plasma pool that exceeds 1,000 donors
- ✓ Meets CFR requirements for measles, tetanus, and diphtheria while standardizing antibody to a specific pathogen
- ✓ ADMA's patents demonstrate that the product also contains elevated levels of antibodies to other respiratory viral pathogens [12]
  - influenza (IFV) A and B
  - human metapneumovirus (hMPV)
  - parainfluenza virus (PIV) 1, 2, and 3
  - coronaviruses (CoV) OC43 and 229E
- ✓ ADMA's manufacturing process leads to lot-to-lot consistency with a high-quality impurity profile
- ✓ Viral clearance and inactivation of enveloped viruses during collection and purification processes

Our IVIG is produced using plasma tested with ADMA's proprietary microneutralization assay that screens and identifies donors who possess sufficient levels of naturally occurring neutralizing antibodies to RSV.[8]

Learn more about us:
admabiologics.com or **800-458-4244**

Learn more at

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