

Microbiology notes from 1997
Chapter 19
Hypersensitivity

Hypersensitivity – Altered, enhanced immune reactions leading to pathologic changes.

Immune system can sometimes go out of control. When it does, we have an allergic response. Which is also known as hypersensitivity.

When we first encounter an antigen, the first time we are sensitized. Second time is called an anamnestic response (also called memory response). A rapid rise in antibody titer following exposure to an antigen after a primary response to that antigen. IIG goes sky high. That can be enough to kill you because you have a severe histamine release.

This reaction known as:

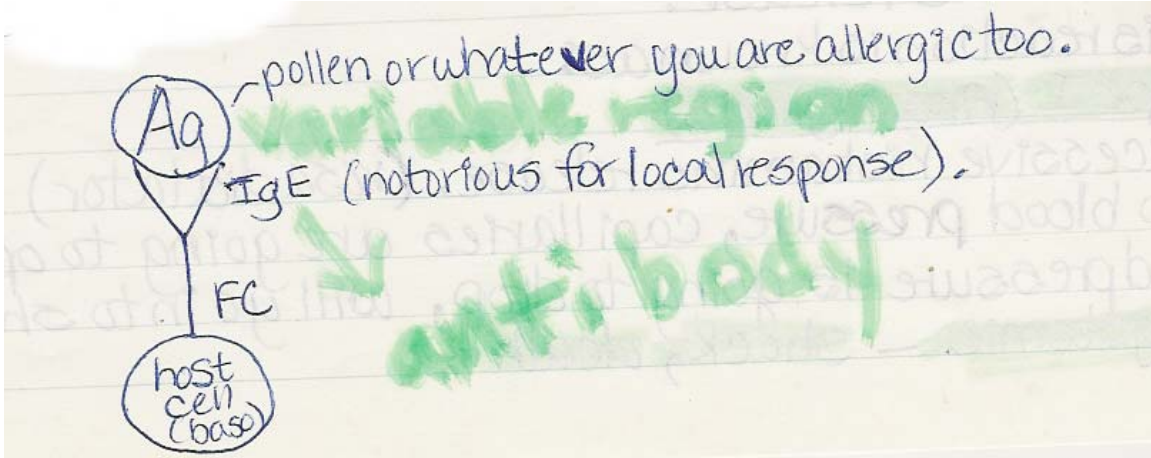
Type I anaphylaxis

- Excessive histamine release. Vasodialator.
- No blood pressure, capillaries are going to open, blood pressure is going to drop, will go into shock.
- Systemic – shock, death
- IgG and IgE tend to play a role in this.
- Typically, you can include in anaphylactic agents things like:
 - **Pollen, which will not be enough to kill you
 - **Insect venom (can kill)
 - **Toxins (bacterial or viral/fungal)
 - **Drugs (2% only of the population is truly allergic to penicillin).
- If not systemic, consider it localized, or local anaphylactic response. This does not mean in one area like you would consider localized, it can mean you have:
 - **hives – which is a rash you get all over.
 - **Watering eyes.
 - **Breathing difficulties.
 - take an antihistamine to try and counteract the effects of local anaphylactic.
 - **Flu – can be enough to kill someone.

People who are concerned with anamnestic response, carry around with them epinephrine which is an adrenaline, and take if in cases like a bee sting, or when they eat a food that they shouldn't.

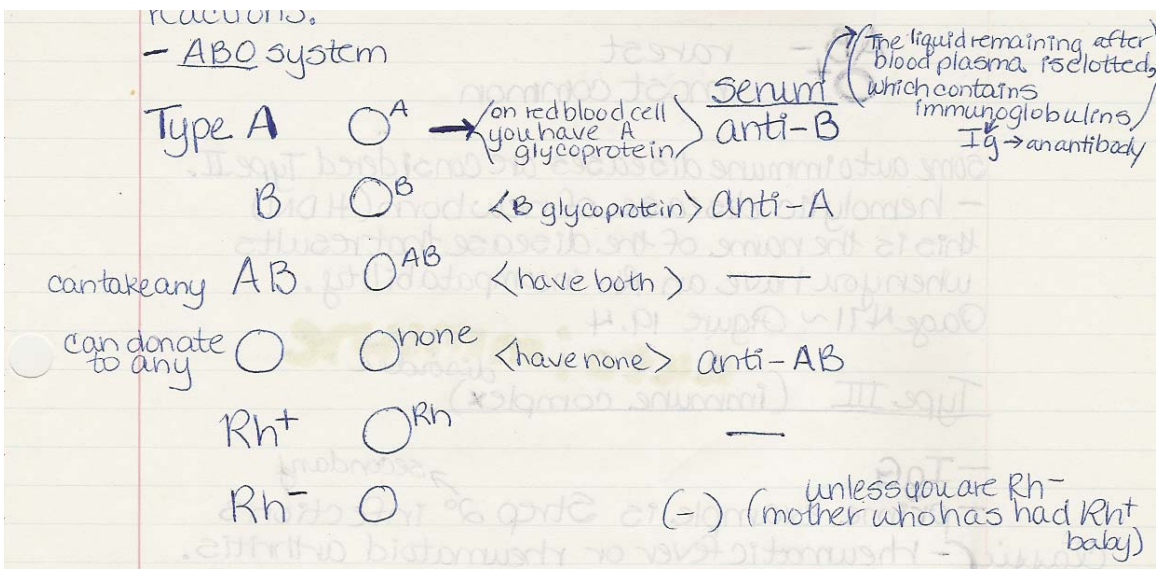
IgE – what most people encounter when they have high fever.

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Type II (cytotoxic) hypersensitivity

- We talked about this with Rh compatibility
- Usually IgG, or IgM are involved with this sensitivity. IgG crosses the placenta, that's why you have a problem with Rh.
- Another serious problem is transfusion reactions.
- ABO system.



When you prepare for surgery, you do not just check ABO and Rh system, they also check your antibody panel, where they check out a lot of different type of blood group antigens.

When you're hanging a unit for transfusion, you're hanging most of the time washed packed RBC (red blood cells). You're giving the patient cells, not giving them whole blood, unless it is a whole blood transfusion. 90% of the time you are giving washed packed cells.

Genetically determined by 3 genes.

Washed RBC. Plasma is washed of antibodies. These red blood cells do not contain antibodies, they are strictly red blood cells with the antigen.

AB- the rarest blood type

O+ -- the most common.

Some auto immune diseases are considered Type II.

- Hemolytic disease of new born (HDN). This is the name of the disease that results when you have an Rh incompatibility.

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Type III (immune complex disorder)

- IgG
- Prime example is Strep 2° (secondary) infections
- Rheumatic fever or rheumatic arthritis. Classic secondary responses to repeated strep infections.
- Glomerulonephritis – which is a kidney infection. Classic secondary responses to repeated strep infections.

What happens is the antigen-antibody complexes that result are not cleared out by the body. It's kind of an usual thing, but they deposit in organs, particularly in the kidneys, they can deposit in the joints giving you arthritic conditions. They felt that this is due to the M. protein, which is a component of the Strep. Part of the Strep is made by M. protein and this protein for some reason tends to not be cleared by the body, and deposit in the organs. Kind of a mystery. It's almost like an autoimmune disorder.

- Lupus erythematosis – you actually make more anti-DNA. Start attacking your own cellular components.

Type IV (cell mediated)

An immune response that involves T-cells binding to antigens presented on infected cells, T-cells then differentiate into several types of effector T-cells including helper and cytotoxic.

- This involves T-cells, not antibodies.
- PPD – purified protein derivative. Tuberculosis if + PPD is raised.
- Reasons if raised:
 - Had TB
 - Have TB
 - Had exposure to TB
 - Vaccine (BCG) loose screen to disease

Flat means nothing.

Mantoux also checks for TB. PPD more purified.

Transplants response

- Organ rejection. It's the T-cell that is going to do the organ rejection for the transplant itself based on the MHC. To do an organ transplant, you have to check the MHC, ABO, Rh, and other blood groups of both donor and recipient. Have to have a very close match.

Terms associated with transplants

Autograft – get it from yourself (a tissue graft for yourself). Closest match.

Isograft – identical twin. Tissue grafts between identical twins.

Allograft – somebody else. A graft between people who aren't identical twins.

Xenograft – animal. A tissue graft from another species.

Banned research – head transplant on monkey. Monkey woke up and lived for six days on life support.

Lab techniques – using Ag – Ab (serology).

Source: class notes and textbook:

Tortora, Gerard J., Funke, Berdell R., Case, Christine L.

Microbiology: An introduction, Fifth edition. Redwood City, CA. The Benjamin/Cummins Publishing Co., Inc., 1995