Mysteries of the immune system
by Patricia Adams, BS, CNC, NHC, ND
for Nature's Sunshine Products October 2016 Education week

I work in a clinical setting, my bachelors degree is in Clinical Nutrition, and I am Board Certified in Holistic Nutrition. I am also Certified in Herbalism and Aromatherapy, and have completed my Doctor of Natural Medicine degree.

People coming into our offices are exposed to lots of information about how the body functions, how the body systems work, and posters and diagrams of properly functioning lymph and immune tissues.

Any time there is a change of season, there are immune challenges; sniffles in the Fall, allergies in the Spring, lung/lower respiratory in the Winter, and sinus/upper respiratory in the Summer. Most people are looking for a way to boost their immune system.

But what if they need to stop boosting their immune system?

What if they have a medical diagnosis of an autoimmune disorder?

What if their immune system is already attacking healthy tissues?

To understand these challenges, and what is appropriate intervention, it is important to understand the basics of how the immune system is supposed to function.

Functions of the immune system:

- Discriminate self from foreign
- Destruction and clearance of foreign substances
  - including cells infected with foreign; antigen
- Ignore self
  - possibly destroy altered self

When the discrimination between 'self' and 'not self' breaks down, the body begins to attack healthy tissue, and an autoimmune situation develops.

Newer science is taking what was called the 'Mysterious link from mind to body' in 1916, to Psycho-Neuro-Immunology, or PNI, who held their first meeting 30 years ago in 1986.

Science is now showing bio pathways between physical and mental health, so thinks like stress, hormones, social interactions, and state of mind play a role in appropriate immune function.

There is a worldwide movement calling out the gut/brain connection, the gut as the "second brain", and that a gut feeling is real, with the same
neurotransmitters present in both places. There are more neurotransmitter receptors in the gut, than the brain, so who is controlling who?

Where does the immune action take place?

- Lymph vessels and lymph nodes are the filtering system for the lymphatic system. Here White Blood Cells lie in wait for foreign substance. These tissues will swell when WBC accumulate in the nodes. Tonsils are a great example of lymph tissue that swells when fighting infection.

- Bone marrow is where the WBC's originate

- The thymus is where T cells differentiate and develop into functioning cells

- Spleen functions include filtering the blood

- The Gut is the largest immune organ in the body.
  - Peyers patches have a high density of WBC's
  - GALT = Gut associated lymph tissue

Our ongoing exposure includes public places, which is what drove the big craze to anti bacterial gels, soaps, etc. This is why I'm so fond of using silver shield gel as a hand sanitizer. I am protected for four hours, and I don't have to worry about passing germs around.

A study of DNA collected in the NY subway system showed that just .2% matched the human genome, and included hundreds of species of bacteria, the "occasional spot of bubonic plague" and many enigmas. (New York Times: "Among the Subway's Millions of Riders, a Study Finds Many Mystery Microbes")

Some exposures are common, like Rhino Virus in the common cold, and some are exotic like the feared Ebola Virus. The key is that the immune system is capable of destroying all invaders.

First line of Immune Defense

Called the non-specific immune. Once there is an entry into the body, like a break in the skin from a wound or cut, the body brings immune cells into the damaged area through the process of inflammation.

A complex set of events sets the stage for the immune cells to be present to destroy or inactivate foreign invaders and set the stage for tissue repair.

- Macrophages engulf and digest foreign cells through a process called phagocytosis, then display a part of the organism (antigen) on their surface as a signal to other immune cells, like T-cells, that there is an invasion or antigen presentation.
• Produces IL-1, a liquid protein called a cytokine that promotes other immune cell activity, like helper T cells

• **NK or Natural Killer Cells** destroy virally infected cells and produce interferon to enhance killing and inhibit viral reproduction. This can be called a promiscuous killer, because it does not need to recognize the invader to destroy it. A great way to watch these NK cells destroy a tumor is found on you tube:

  https://www.youtube.com/watch?v=HNP1EAYLhOse

  the video ends with "the natural killer cell is one of the key fighters in viral and cancerous growths"

If you can increase positive emotion and decrease negative emotion, you can increase your NK cells. This was proved by a group of method trained actors in Los Angeles. These actors are trained to actually induce the emotion they are portraying, and they were able to measurably increase their NK cells and the ability to destroy tumors by increasing positive emotion. *(Laugh therapy anyone?)*

**Second line of Immune Defense - Specific Immunity**

After a couple days, the second line of defense revs up, and requires specificity, or fit, between immune cell receptor and antigen. This is a monogamous killer, having a specific receptor to a specific foreign body.

• **T Lymphocytes** are cell-mediated immunity, activating through a process of contact, differentiation, and clonal expansion or proliferation, literally creating an army of that type of T cell.
  
  • **Cytotoxic T Cells** - Killer T cells, are capable of destroying virally infected cells as well as cancer cells, by releasing toxic substances which perforate the abnormal cell (perforin, granzymes). These cells literally produce fluid to punch holes in specific cells.
  
  • **T Regulatory Cells** come into play when the immune is too active, to suppress the immune response.
    
    • Potent suppressor of the immune response, stops the proliferation of T cells, important in limiting immune reactions
    
    • Maintains tolerance against self-antigens so the immune system does not attack self
    
    • When you cannot stop the killer T response, it begins to kill healthy cells as well, creating armies of T cells against self
Our current Medical Model is steroids to suppress the immune system, leading to all the diseases of a suppressed immune system, including but not limited to cancer, bone loss, risk of infection, tissue destruction and diabetes.  *(Lippincott’s Nursing Drug Guide 2010)*

"Modulation of T regulatory cells may be useful in the therapy for autoimmune diseases" *(Dr. Margaret Kemeny, UCSF)*

- **Helper T Cells** activate and enhance function of B cells, macrophages, and cytotoxic T cells. Can also suppress these activities.
- Produce interferon Gamma and IL-2.

- **How important are these (CD-4) Helper T cells?**
  - The HIV virus can target CD4 helper T cells, infect them and kill them
  - Loss of these cells can devastate the immune system
  - Resulting in Immune deficiency, AIDS

**B Cells (Humoral Immunity)**
The other part of the second line of defense are the B Cells, which replicate to produce antibodies. Antibodies are protein molecules that can coat and neutralize infected cells, help other cells kill infected cells, and activate complement systems.

  - Produce IgM, IgA, IgE, IgD

No wonder the immune system is so often referred to as an army!

**T cells help B cells and B cells Help T cells**

**Most of the communication takes place via substances called cytokines**

- Proteins released by the immune cells that act on target cells to regulate immunity
- Pro inflammatory cytokines coordinate inflammation, are produced by macrophages in response to microbes; mediate acute inflammation
  - Markers: IL-1b, TNFa, IL-6
- Anti inflammatory cytokines control the inflammatory response
  - Markers: IL-10

**Inflammation is a natural first response, and only becomes a problem when it doesn’t stop.**

- Excess pro inflammatory markers mean the immune never shuts off (autoimmune)

The best marker for systemic inflammation is C Reactive Protein (CRP), reflecting general levels of inflammatory activity in your body
So what happens when the immune system is over active?

When you cannot stop the killer T response, it begins to kill healthy cells as well, creating armies of T cells against self:

- Fibromyalgia may have antibodies against muscle tissue
- Neuropathy may have antibodies against neurofibrillary tangles
- Myelin antibodies are active in Multiple Sclerosis
- Intrinsic Factor required for vitamin B-12 absorption may be destroyed
- Pancreas antibodies may lead to blood sugar issues
- Cerebellum antibodies may be at work in carsickness, loss of balance

(D. Kharrazian 2008)

An autoimmune disease is a condition arising from an abnormal immune response to a normal body part.[1] There are at least 80 types of autoimmune diseases.[1] Nearly any body part can be involved.[2] Common symptoms include low grade fever and feeling tired. Often symptoms come and go.[1]

The cause is generally unknown.[2] Some autoimmune diseases run in families such as lupus and certain cases may be triggered by infections or other environmental factors. Some common autoimmune disease include celiac disease, diabetes mellitus type 1, Graves disease, inflammatory bowel disease, multiple sclerosis, psoriasis, rheumatoid arthritis, and systemic lupus erythematosus. The diagnosis can be difficult to determine.[1]

Treatment depends on the type and severity of the condition. Nonsteroidal anti-inflammatory drugs (NSAIDs) and immunosuppressants are often used.[1] Intravenous Immunoglobulin may also occasionally be used.[2] While treatment usually improves symptoms they do not typically cure the disease.[1]

About 24 million (7%) of people in the United States are affected by an autoimmune disease.[1][4] Women are more commonly affected than men. Often they start during adulthood.[1] The first autoimmune diseases were described in the early 1900s.[4]

(Wikipedia, has a lot of specific data and exhaustive list)

Information from Johns Hopkins Medicine:
Q: How many autoimmune diseases are there?
A: The National Institutes of Health has estimated that at least 80 human diseases are caused by primarily or secondarily by an autoimmune response. New diseases are being added to the list frequently.

Q: How prevalent are autoimmune diseases?
A: The National Institutes of Health estimates that five to eight percent of Americans have an autoimmune disorder.

Q: Why are autoimmune diseases so different?
A: The presentation of an autoimmune disease (that is, the signs and symptoms) depend upon the location of the autoimmune attack on the body. Autoimmune diseases have been found in virtually every organ system in the body.

Johns Hopkins (http://autoimmune.pathology.jhmi.edu/faqs.cfm)

Remember that the tissues involved are not the whole story, the tissues are the victim of the immune system!

Is the immune system confused?
What could cause that level of confusion?

Science says that as we age, most of us will develop some sort of autoimmune disease, from:
- The Environment
  - Pollution, Pesticides, Toxic food (GMO food)
- Genetics
  - 90% higher risk if a parent has an autoimmune disorder
  - Vitamin D receptor polymorphism
- Stress Response
  - Elevated cortisol over time = tissue breakdown
- Chemical Exposure
  - Medication, Hormones in animal products, Job Exposure, etc
  - Heavy Metal toxicity
  - Pesticides, Pollution, Mercury Fillings, etc
- Endocrine Imbalance
  - Adrenal, pancreatic, pituitary and thyroid hormones all work together
  - Estrogen surges from birth control, second child, menopause, pregnancy, etc
  - High levels of plant estrogens in soy
  - Read The Whole Soy Story, by Kaayla Daniels

And don’t forget about that gut... the largest immune organ!
Intestinal dysbiosis, Candida, Leaky Gut, etc.
What is the worst thing we can do to the gut?

Gluten, certainly at the top of the list!
- Read Wheat Belly (but skip the recipes in the back) by Dr. Davis
- Read The Vegetarian Myth, by Lierre Keith
- Read Why Isn't My Brain Working, by Datis Kharrazian

Do a google search on gluten and _______________________________
Insert the name of your autoimmune disorder!

Many of these diseases have a common genotype with ....
Celiacs disease (the HLA DQ8 genotype)

Number one:
Take gluten completely out of your diet, and eliminate corn as well, since gliadin in corn is a similar protein to gluten
- Get a new toaster
- Buy a new cutting board
- Eliminate corn, wheat, barley, kamut, rye, and soy
- Remember that gluten is only in grains, consider a no grain diet!
- Watch out for cream based soups, bottled salad dressing, gravies and sauces.
- Gluten is cheap, and is even in soy sauce!
- 
- Read Grain Brain by Dr. David Perlmutter

Number two:
Get sugar out of your diet!

- Ideally, retrain your taste buds.
- Meanwhile, use Stevia, Xylitol, or a small amount of raw local honey
- Baking with Coconut Sugar may be ok, but you’re going to be using nut flours like almond flour and coconut flour.
- Sugar is the number one cause of inflammation in the body, and remember that when your brain isn't getting the protein and fat that it needs, you will crave sugar.
- Blood sugar balance is better regulated when there are no grains in the diet.

- Read The No-Grain Diet by Dr. Mercola
- Read Sweet Death by Dr. Rodier

Number three:
Eat plenty of good fats
• Don't lump saturated fat with trans fat, one is vital, while the other is deadly
• Realize that a giant part of who you are is fat, because every cell membrane is made of lipids, or fats
• Cell membranes consist of Saturated Fatty Acids (SFA's), Monounsaturated Fatty Acids (MUFA's), and a small amount of Poly Unsaturated Fatty Acids (PUFA's)
• So many studies have proved that an unhealthy balance of omega 3 to omega 6 is inflammatory, that this is now well accepted in nutrition circles as well as medical circles
• Science is showing that up to 50% of the cell membranes are SFA's, and up to 40% is MUFA's, with about 10% being PUFA's

See "The Oiling of America" by Sally Fallon

• Cells replace at various intervals, and must have plenty of dietary fat to do so
• Some White Blood Cells replace multiple times per day

People wonder if by eating more fat, they'll become fat, but only carbohydrates are easily stored as fat. Excess protein can also be stored as fat, but fat is metabolically active, and is not stored as fat

People wonder if they will damage their heart when they eat for their immune system, but the truth is that the adrenals use cholesterol to regulate the heartbeat

Read The Fourfold Path to Healing by Dr.Thomas Cowan
Read Tripping Over the Truth by Travis Christofferson
Read Modern Nutritional Diseases by Alice and Fred Ottoboni
You'll have an "Ottoboni" experience

Look at the food pyramid from www.NourishingOurChildren.org:

• Notice that fruits and vegetables are two separate categories
• Notice that grains and fruit are at the top of the pyramid

• What you cannot see is their recommendation that all animal products be non-CAFO (Concentrated Animal Feeding Operation)
• All the milk is raw
• All the meat is raised on pasture

• Until the 1940's all the animals were on pasture, and all the milk was raw. This is how we subsisted for thousands of years as humans; hunting and gathering.
There is a "real food" movement going on, and this is where you need to be if your immune system is confused from all the dietary and environmental chemicals the FDA has allowed.

**Number Four:**
**Avoid immune stimulation**
Get the toxic chemicals out of your world and heal your gut. Aromatherapy is a terrific way to create your own cleaning products, and personal care products.

Remember that something has fired up the immune system so much that it is attacking your own tissue, so

- **Stop immune stimulation**, including
  - Echinacea
  - Goldenseal
  - Immune stimulating mushrooms

**Number Five:**
"Modulation of T regulatory cells may be useful in the therapy for autoimmune diseases" *(Dr. Margaret Kemeny, UCSF)*

"Use supplements daily, remember that you can't fix the disease, just stop the attacks. Once the genes are turned on, they are on forever" *(D. Kharrazian, 2008)*
So, how do we modulate regulatory T Cells?
Since the regulatory T cells balance overactive immune:

**Daily:**

**Vitamin D3** - receptors tend to not work as well, so additional supplementation is a must, ideal level is (85-100)

**Krill Oil** - rebuild cell membranes, anti inflammatory, help chemical messengers within the body communicate better, includes fat soluble K2

**Colostrum** - amphoteric, balances the immune, useful for everyone who tolerates dairy.

**Cordyceps** - chinese formula useful for balancing the immune

**N-Acetyl Cysteine** - raise glutathione in the liver, detox metals

**Probiotics** with a variety of at least 30 billion organisms - repopulate the gut with beneficial bacteria

*During Immune Stress, use non-stimulating formulas*
  - Silver Shield - second immune system
  - Hi Potency Garlic - effective and non-stimulating

*Remember that odorless garlic is worthless garlic*
  - Seasonal Defense - changes of seasons
  - Histablock - inflammatory and allergic responses

You can always support the tissue being attacked, but never neglect to balance the immune system!

Pub Med says that the risk of coexisting autoimmune disorders is real:

**CONCLUSION:**

This is one of the largest studies to date to quantify the risk of diagnosis of coexisting autoimmune diseases in more than 3000 index cases with well-characterized Graves' disease or Hashimoto's thyroiditis. These risks highlight the importance of screening for other autoimmune diagnoses if subjects with autoimmune thyroid disease present with new or nonspecific symptoms.

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**Dr. Kharrazian says that 52% have antibodies against other tissues....**

Always balance the immune system!