



The Autoimmune Epidemic
by Donna Nakazawa (2008)

CLASS: G100

This is your test but... do not try to fill in the blanks! We created a Test Answer Sheet which is easy to download, fill in the answer, and email.

Foreword

1. There is almost universal agreement among scientists and physicians that the environmental toxins and chemicals to which we are increasingly exposed are interfering with the immune system's ability to distinguish _____.
2. Most of the risk comes from environmental _____ rather than from genetic susceptibilities.

Introduction

3. Guillain-Barre syndrome (GBS) usually attacks a month or so after a patient has had a common _____ or _____ infection.

Note: For some, GBS occurs after a vaccination. Both GBS and Multiple sclerosis result in the destruction of myelin sheaths of the nerves. They are both considered to be autoimmune inflammatory diseases. The difference is where the damage occurs. GBS attacks the peripheral nervous system while MS attacks the brain and spinal cord nerve cells. MS affects one in every 500 people!

“The first event in the pathogenesis of MS may be a viral infection in childhood. Activated T-lymphocytes generated during such an infection cross the blood- brain barrier and become sensitized to myelin antigens.” - <http://neuropathology-web.org/chapter6/chapter6aMs.html>

Chapter 1

4. In gastroesophageal reflux disease (GERD), the stomach overproduces gastric acid and the esophagus spasms, causing excess _____ to rise into the fragile lining of the throat.

5. Antiphospholipid antibody syndrome (APS), also known as “sticky blood” or Hughes Syndrome, is an autoimmune disease in which the body produces antibodies, or immune fighter cells, that mistakenly disable the very proteins in the blood that the body needs to prevent excessive _____.
6. In a wide range of autoimmune diseases, the body’s immune cells lose their ability to read the difference between your own _____ and the foreign bacteria or viruses - or other unrecognizable microscopic organisms from the environment around you - that enter your body.
7. Antibodies that turn on one’s own tissue are known as _____.

Chapter 2

8. According to a 2003 study by the Mount Sinai School of Medicine in NYC, in collaboration with the EWG, after testing the blood and urine of 9 representative Americans from around the country for 210 substances, scientists discovered that each volunteer carried an average of _____ industrial compounds, pollutants and other chemicals.
9. Polybrominated diphenyl ethers (PBDE) are flame retardants which are not molecularly bound to anything in the products into which they are manufactured. As a result, they continually _____ out from the plastics that make up our computers, TVs, wire insulation, the insides of our window frames, etc.
10. Teflon is manufactured with a chemical known as perfluorooctanoic acid, or PFOA - as are other nonstick cookware, car parts, flooring, computer chips, phone cables, etc... PFOA can now be found in _____ samples of 96 percent of people in the United States.
11. Commonly used today on melons, traces of _____ are found in the food we eat more than any other pesticide.
12. One of the most potent by-products of exhaust fumes is _____, which is carried into the air by the fuel combustion of diesel trucks and buses. We each receive some small, additional daily dose of dioxin through our steady diet of seafood, meat, and dairy.

13. Dioxin is a recognized immune suppressor. Recently, researchers have observed that dioxin may work in more complex ways on the immune system as well- not only by suppressing immune cells, but by overcoming control mechanisms that should _____ an autoimmune response.
14. T cells are made in the _____. From the bone marrow they move to the thymus. It is in the thymus that T cells mature before they enter your bloodstream. Regulatory T cells do pretty much what their name implies: They act as the senior officers of the other T cells, in this case ensuring that educated T cells will not mistake the body for a foreign antigen and turn against the body's own organs or tissues as they diligently scour the body for invading agents.
15. When endocrine disruptors mimic estrogen they can wreak havoc in one of two ways: They block the estrogen receptor site altogether, keeping natural estrogen from triggering the responses it's supposed to so that it can do its normal job in the body. The second way is not by blocking communication completely, but by sending the _____ between cells.
16. Endocrine-_____ chemicals are remarkably adept at traveling through the bloodstream and entering our cells by tricking specific responses on cells into believing that the chemicals are, in fact, real estrogen being secreted by our own bodies.
17. Pound for pound, breast-feeding babies get more _____ per meal, at more concentrated levels, from the healthiest known food source on the planet (no matter how contaminated breast milk may be, it is still the best food for babies).
18. Trichloroethylene (TCE) is regularly detected in breast milk, and 10 percent of Americans now have detectable levels of TCE in their _____, from exposure through drinking water as well as breathing it in from the air around us. One of our most significant contacts, however, comes from taking _____.
19. _____ toxins appear to mess with normal internal signaling pathways, making it difficult for our immune cells to recognize what is foreign and what is self.

20. In 2000, Gilbert and Pumford and colleagues published two back-to-back groundbreaking studies: they were among the first immunologists and toxicologists to show that _____ exposure to environmental toxicants could be a _____ stimulator of an autoimmune response.

Some regulations and recommendations for trichloroethylene include:

Federal Organization	Regulation or Recommendation
U.S. Environmental Protection Agency (U.S. EPA)	EPA set a maximum contaminant level goal (MCLG) of zero as a national primary drinking standard for trichloroethylene; EPA noted liver problems and increased risk of cancer as potential health effects from long-term exposure above the maximum contaminant level (MCL) of 0.005 milligrams per liter (mg/L; 5 ppb).
Occupational Safety and Health Administration (OSHA)	OSHA set a permissible exposure limit (PEL) of 100 ppm for trichloroethylene in air averaged over an 8-hour work day, an acceptable ceiling concentration of 200 ppm provided the 8-hour PEL is not exceeded, and an acceptable maximum peak of 300 ppm for a maximum duration of 5 minutes in any 2 hours.
National Institute for Occupational Safety and Health (NIOSH)	NIOSH considers trichloroethylene to be a potential occupational carcinogen and established a recommended exposure limit (REL) of 2 ppm (as a 60-minute ceiling) during the usage of trichloroethylene as an anesthetic agent and 25 ppm (as a 10-hour TWA) during all other exposures.

“The National Toxicology Program (NTP) has determined that trichloroethylene is a **“known human carcinogen”**. The EPA and the International Agency for Research on Cancer (IARC) have determined that trichloroethylene is “carcinogenic to humans.” Public Health Statement for Trichloroethylene. Agency for Toxic Substances and Disease Registry website. <https://www.atsdr.cdc.gov/phs/phs.asp?id=171&tid=30>. Accessed March 5, 2017

21. Investigators are still uncovering new lupus genes every year. But the rough guesstimate is that about _____ - an estimated 20-25 percent of the general population - carry some combination of genes that make them more susceptible to one or more autoimmune disease.

22. Twin studies show that autoimmune disease is roughly 30 percent genetic and _____ percent environmental. As one researcher put it, while genetics may load the gun, it’s environment that pulls the trigger.

23. For some, the final drop that spills the barrel may be an infiltrating _____ that taxes the immune system just one degree too much, setting an autoimmune response in motion; for others, it might be an unexpected environmental hit that pushes the immune system into overload and chaos.
24. Cancer research claims 10 times the annual research funding of autoimmune disease, although cancer affects less than _____ as many people.
25. Today, _____ chemicals are registered for use in the United States and the US Environmental Protection Agency approves an estimated seventeen hundred more a year with very little screening. The FDA approves about _____ percent of new compounds *without restrictions*.

Chapter 3

26. In lupus, deranged immune fighter cells, triggered into acts of self-sabotage by a combination of genetic predisposition and environmental triggers, can turn against virtually any _____ or _____, including the joints, kidneys, heart, lungs, brain, blood, or skin, inflicting severe pain, inflammation, and cellular damage.
27. Scleroderma is a progressive autoimmune disease in which the immune cells attack the connective tissue in the body - the _____ within human skin and tissue as well as the **elastin** in the ligaments that connect bones - scleroderma can leave damaging scar tissue in the skin as well as organs.
28. Lupus and other autoimmune diseases, unlike cancer, are **not** _____ diseases, meaning health departments do not collect information on who has an autoimmune disease, much less how many are afflicted with each of the nearly one hundred different diseases that fall under the autoimmunity umbrella.
29. Alopecia areata is an autoimmune disease in which, for reason unknown, the body's own immune system attacks the hair _____ and disrupts normal hair formation.
30. Blood serum levels of PCBs have been measured in a number of local residents (Anniston, Alabama) in excess of 100 parts per billion. The CDC considers a blood PCB level in excess of _____ parts per billion to be significantly elevated.

Chapter 4

31. “How does a virus attack my nerves?” I wanted to know. “An autoimmune reaction,” he said. “Most likely a _____ on the surface of a molecule of the virus you had looks like a protein on the surface of the molecules of your nerve tissue” - molecular mimicry.
32. For decades, researchers investigating Guillain-Barre syndrome have held suspicion that GBS might be linked to infectious pathogens - not only because patients so often report having been ill 6 weeks prior to getting the disease, but also because clusters of cases have been linked in timing and locale to large, national vaccination programs with vaccines containing _____.
33. Immune cells that are programmed to recognize the proteins from the flu virus set out to find it and attack it. They are able to recognize these proteins as dangerous because they recognize the unique code of _____ on the surface of the virus.
34. In a less healthy body, one _____ by genetic deposition, a heavy burden of chemicals, stress, a processed food diet, or some combination thereof-the immune fighter cells and the antibodies they send forth begin to make costly mistakes. They set out to obliterate all the cells and viruses that share the same sequences, just to be sure they are getting the job done.
35. “Autoantibody,” the word scientists use to designate antibodies that have attacked and bound with healthy tissue in error, literally means “antibody _____ self.”
36. Epstein-Barr virus, or EBV, is a common _____ infection that ordinarily causes anything from low-grade fever and sore throat symptoms in children to mononucleosis in teenagers and adults.

“Since its discovery as the first human tumor virus, Epstein-Barr virus (EBV) has been implicated in the development of a wide range of B-cell lymphoproliferative disorders, including Burkitt's lymphoma, classic Hodgkin's lymphoma, and lymphomas arising in immuno-compromised individuals (post-transplant and HIV-associated lymphoproliferative disorders). T-cell lymphoproliferative disorders that have been reported to be EBV associated include a subset of peripheral T-cell lymphomas, angioimmunoblastic T-cell lymphoma, extranodal nasal type natural killer/T-cell lymphoma, and other rare histotypes”.

Carbone A, Ghoghini A, Dotti G. EBV-associated lymphoproliferative disorders: classification and treatment. *Oncologist*. 2008 May;13(5):577-85. doi: 10.1634/theoncologist.2008-0036.

37. Scientists can now show the precise process by which _____ in streptococcal bacteria mimic cells in the heart, resulting in the autoimmune reaction known commonly as rheumatic heart disease.

Note: Endocarditis is an inflammation of the inner lining of your heart (endocardium) and/or heart valves. The inflammation is typically caused by a bacterial or fungal infection that spreads to the bloodstream. Surgery, some types of dental work, gum disease, inflammatory bowel disease, catheters, and skin sores have been associated with endocarditis.

38. In type 1 diabetes, an autoimmune disease also known as insulin-dependent diabetes mellitus, or IDDM, the _____ under-goes an attack by the body's own immune system and becomes incapable of making insulin.

39. Researchers today are concerned about a more common and seemingly innocuous type of virus within the family of sixty-one nonpolio enteroviruses known as the _____ viruses.

Note: Enteroviruses belong to the Picornaviridae family (small RNA viruses). The enteroviral group includes coxsackievirus, echovirus, and POLIOVIRUS. Enteroviruses are believed to have 2 distinct classes: polioviruses (types 1, 2, and 3) and nonpolioviruses (coxsackievirus, enterovirus, echoviruses, and unclassified enteroviruses).

40. Researchers now know that most peptic ulcers are caused by an infection with the bacterium _____ and can be treated with antibiotics (rather than surgery).

41. _____ signaling to the immune system to fight disease is a good thing, but when cytokine levels are elevated far too long and their signaling becomes uncontrolled, they can hijack the body's immune system to turn against the body itself.

"A study from Australia suggests that a vaccine-induced surge of cytokines (pro-inflammatory chemical messengers) might have been a factor in the **unusual rate of fever and seizures seen in Australian children who received the Fluvax seasonal flu vaccine last year**. The adverse events prompted suspension of use of the vaccine in children under age 5 in Australia in 2010, and the problem remains unexplained." Robert Roos. CIDRAP News. Cytokines suggested as factor in Australian flu-vaccine reactions: <http://www.cidrap.umn.edu/news-perspective/2011/06/cytokines-suggested-factor-australian-flu-vaccine-reactions>. Accessed March 5, 2017

42. In October 1976, the National Influenza Immunization Program officially began. By January 1977, more than _____ cases of Guillain-Barre syndrome had been reported as a direct result of the vaccine.

43. In 1992, 1993, and 1994, people developed Guillain-Barre syndrome after widespread influenza vaccination programs, cementing the epidemiological evidence that _____ strains other than the swine flu could also induce GBS.
44. In 1994, the *Journal of the American Medical Association* reported a dangerous relationship between diphtheria, tetanus, and oral polio vaccines and a number of autoimmune disorders, including Guillain-Barre syndrome. Similarly, a correlation has been reported and debated in scientific journals for years between the _____ vaccine and multiple sclerosis as well as rheumatoid arthritis.
45. Mercury, in one of its forms, _____, is still used in some flu vaccines and some over-the-counter pharmaceuticals. Present until recently in virtually every vaccine children received throughout the 90's, including Hep B, bacterial meningitis, diphtheria, whooping cough, and tetanus, thimerosal is now the subject of a well-known heated controversy questioning whether cumulative doses in childhood vaccines may play a role in autism and other developmental delays.
46. In the United States, coal-fired power plants alone spew about _____ of mercury into the air each year.
- Note:** When recommending the use of herbs and homeopathics to lessen the load of heavy metals you will hear "where did I get metals?" Most are unaware of the mercury that enters the environment and eventually our food and water.
47. According to the CDC, _____ percent of women of childbearing age now have mercury levels that exceed the Environmental Protection Agency's safety standard. This is no small thing: researchers know that mercury can cross the _____ and affect the developing brain of the fetus. Mercury, like lead, is a potent neurotoxin.
48. **Elemental** mercury is the type that you find in dental amalgam. People who have fillings with dental amalgam can build up body burdens of mercury because, over time, mercury from their teeth leaches into the body and accumulates in the _____.
49. Methyl mercury exposure does particular damage to the _____ nervous system.

50. Somehow, mercury produces such a potent response in the body that it not only creates surprising hybrid proteins, it also forces the immune system, in a process not fully understood, to react against pure _____.
51. In 1999, a baby who received all recommended vaccines at her two-month checkup might well have been injected with up to _____ times the EPA's safety limit for daily exposure to mercury.
52. Twenty million Americans now suffer from asthma, and 7 million of these are children. The number of people suffering from asthma in the U.S. increased _____ percent between 1980 and 1996.
53. Celiac disease occurs when in order to protect the body from foreign substances in the _____ tract, the immune system produces antibodies that mistakenly attack the lining of the gut as well, resulting in autoimmune disease.
54. Should the mast cells signal the immune system to stay turned on just long enough to fight that virus, all is well. But should the mast cells stay turned on for too long and continue to release _____ that further stimulate the immune system to attack the invading virus-and then seconds later send that same message alerting the immune system to respond to a chemical in a processed, food-colored cheese sandwich, and a second later do it again when it senses that the body has been exposed to flame retardants-the innate immune system never gets to **rest** from its high state of alert.

Chapter 5

55. The accepted science has long held that _____ pathways can only grow during our initial development when we are still fetuses in the womb.
56. Myelin sheaths and _____ are of critical importance in MS and transverse myelitis research. Much MS research is focused on an autoimmune process in which immune fighter T cells, which are only supposed to attack foreign pathogens and invaders, mistakenly attack and damage _____.
57. Lupus related _____ disease is an autoimmune disease in which sufferers experience symptoms such as dry eyes, dry mouth, and difficulty swallowing.

58. _____ antibodies are produced when the body's immune system fails to recognize insulin-generating islet cells produced by the pancreas as natural to the body and attacks them as if they are dangerous foreign substances, suddenly decreasing the body's ability to produce the insulin that helps cells absorb glucose.
59. Interleukin-6 is a _____ cytokine, a messenger that cells of the immune system use to communicate with one another. One of the cell types injured by high levels of the protein IL-6 included oligodendrocytes, which help to produce the protective myelin sheath around nerve cells.
60. Women account for 80 percent of the 23.5 million Americans with autoimmune disease. _____ shifts in pregnancy, menopause, and aging are *associated with fluctuations* in the course of autoimmune disease. (This does not say hormones cause the disease, but that hormones can influence the symptoms.)
61. What researchers do know is that sex hormone balance is a crucial factor in the optimum regulation of immune and inflammatory responses and that hormones such as estrogen that women produce modulate the activity of _____ in our bodies, leading in ways we do not yet fully understand to a more reactive autoimmune response.
62. Currently on the market for treatment of rheumatoid arthritis and Crohn's disease are classes of drugs that remove or _____ certain immune activity, such as tumor necrosis factor, or TNF.
63. _____ necrosis factor, which belongs to a group of proteins that communicate with cells, is essential in maintaining cell life and death decisions and control of T-cell populations.

Chapter 6

64. Known as _____, this devastating autoimmune disorder can lead to paralysis in the legs and turn life threatening as it attacks nerves throughout the lower organs of the body, even shutting down the bladder and bowels.

65. “Even in the field of inflammatory bowel disease the firm belief is that diet plays no role,” Mullin says. “Yet we have clear data showing that changing an autoimmune-disease patient’s diet and adding in simple supplements can _____ change the course of his or her illness.”
66. One of the most significant ways that foreign antigens, which may trigger the immune system to overreact, can enter the body is through what we _____.
67. Processed meats are preserved with _____. Patient studies show that higher intake of nitrates and nitrites is associated with a higher risk of developing type 1 diabetes.
68. An essential first step for anyone suffering from autoimmune disease is to ensure that his or her gastrointestinal tract is _____.
69. A healthy _____ allows only digested nutrients to pass into the bloodstream. In patients with immune and inflammatory-based illnesses, the body’s intestinal lining often becomes impaired, thus permitting larger molecules, such as bacteria and undigested foods, to slip through.
70. “Untreated gut _____ can perpetuate the autoimmune reaction”, says Mullin.

Note: Stool tests for parasites, candida, yeast are often false negative! “Almost all testing for parasites involves a microscopic analysis of a stool sample. This means that a very small smear of a much larger stool sample is viewed under a microscope. The parasite, or more likely the eggs from the parasite, must be present in that smear, and must be present in a significantly high amount to be found during the microscopic exam. **And the lab technician must be proficient at recognizing it when they see it.**” - www.ibstreatmentcenter.com

The CDC recommends that three or more stool samples, collected on separate days, be examined. Your health care provider MAY request that the lab use special stains or that special tests be performed to look for parasites not routinely screened for - **if you are looking for and using methods that will find ABC you will miss DEF.**

71. If food components or bacteria that _____ through that intestinal barrier share a similar protein sequence to a virus or other pathogenic microorganism that the immune system deems as unsafe, it can generate an immune response, leading to an autoimmune reaction.

72. Food allergies are divided into two major categories: IgE mediated and T-cell mediated allergies. IgE allergic reactions are _____; after being exposed to the food, your body quickly overproduces what is called immunoglobulin E antibodies, or IgE.

Note: Allergy is not the same as intolerance/sensitivity. Allergies involve the immune system immediately. Intolerance symptoms vary with the individual but include acid reflux, bowel cramping, constipation/diarrhea, body/joint aches, general inflammation, etc.

Note: (short list of common foods and additives to avoid, page 234).

73. According to new data from the Center of Disease Control and Prevention, _____ accounts for 12 percent of all food-borne illnesses- a number that has been on the rise as of late.

74. Food-borne illnesses have been linked to developing Guillain-Barre syndrome, the worsening of _____ disease, and sparking autoimmune disease flares.

75. Antioxidants: In the normal process of metabolism, cells produce unstable _____ molecules. These unstable molecules- known as free radicals- damage cells. Exposure to pollutants can increase free radicals, as can smoking and use of cooking oils that become overheated. Antioxidants help to repair the damage done by _____.

Note: Free radicals are oxygen-derived radicals, reactive oxygen species

“Oxygen-derived radicals are generated constantly as part of normal aerobic life. They are formed in mitochondria as oxygen and reduced along the electron transport chain. Reactive oxygen species are also formed as necessary intermediates in a variety of enzyme reactions. It is best not to think of oxygen radicals as "bad". They are generated in a number of reactions essential to life and, as mentioned above, phagocytic cells generate radicals to kill invading pathogens. There is also a large body evidence indicating that oxygen radicals are involved in intercellular and intracellular signalling”. R. Bowen. Free Radicals and Reactive Oxygen. Colorado State University. www.vivo.colostate.edu/hbooks/pathphys/misc_topics/radicals.html. Accessed March 6, 2017

76. Antioxidants can also be found in supplement and vitamin form. One particular antioxidant currently under study, alpha lipoic acid, has been shown to help in the treatment of MS by balancing T-cell activity and has also been found to help lessen symptoms in those with diabetic _____.

77. 75 percent of Crohn's patients are deficient in _____. There is growing evidence that Vitamin D plays a central role in rebalancing T-cell activity, which is why it is proving to be such an important adjunct to the treatment of autoimmune disease such as MS and Crohn's disease.
78. The human gut is full of _____ most of it beneficial. But lacking a complete set of these healthy bacteria can interfere with food digestion and fighting off illness and inflammation.
79. In autoimmune disease, the link between stress and disease is profound. When we are stressed, our adrenal glands produce several hormones, including adrenaline and cortisol. The stress response starts in the _____, a part of the brain that also regulates body temperature, respiration, hunger, sleep cycle, sexual function, and blood pressure.
80. Cortisol plays a central role in the immune system's responses and activity. Under stress, cortisol mobilizes all major types of immune cells to battle stations in the body- primarily along the _____.
81. Each day an average of _____ new chemicals are put out on the market in the United States without any testing as to whether or not they pose a challenge to the immune system.

_____END OF QUESTIONS