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# INTEGRATIVE IMMUNITY—QUADEPIDEMICS: EFFECTS OF ENVIRONMENTAL TOXINS (PESTICIDES, INDUSTRIAL CHEMICALS, COMMON HOUSEHOLD CHEMICALS, COSMETICS AND COSMECEUTICALS) ON THE GROWING ESTROGEN-OBESITY-ALLERGY-ANXIETY/DEPRESSION EPIDEMICS, ENDOCRINE AND IMMUNE RESPONSES

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**Background:** In the early 1980s, the Centers for Disease Control and Prevention (CDC) through its Epidemic Intelligence Service (EIS) discovered that several US states were gaining weight abnormally. In 1984, the CDC created the Behavioral Risk Factor Surveillance Survey (BRFSS) to investigate. In 1985, the CDC published the first obesity map based on BRFSS data. Obesity has become epidemic not only in North America, but in the whole world. Concurrent to the obesity epidemic, we now have the estrogen, allergy, and anxiety/depression epidemics. In 1992, the United States Geological Survey (USGS) published the pesticides maps and in 2001, the CDC started biomonitoring. The chemicals found in the blood and urine of individuals from different US states are reported in the CDC Fourth Report. This report is updated every two years and continues to show growing chemical list overtime.

**Objective:** We sought to establish the relationship between environmental toxins, the endocrine system, and the immune system that may explain the plethora of 21st century chronic diseases.

**Methods:** We used an evidence-based approach called Integrative Immunity and the Healthcare Utilization Project (HCUP) database, the CDC obesity maps, the USGS pesticides maps, chemicals found in the CDC Fourth Report, and medical geography techniques, to make sense of current estrogen-obesity-allergy-

anxiety/depression epidemics. Four key diagrams were conceived to relate pesticides to obesity and comorbidities, and pesticides to environmental and food allergies.

**Results:** We demonstrate that the areas of the heaviest pesticide spray correspond to the areas of the heaviest obesity, morbidity, mortality, allergy, anxiety/depression and even divorce rates. Environmental toxins cause hormonal imbalance that leads to obesity and its comorbidities. Some of these toxins such as xenoestrogens have receptors on the mast cells and basophils, and causes histamine and leukotriene release that are responsible for nasal, respiratory, cutaneous, and food reactions. Acetylcholinesterase inhibitor chemicals causes depletion of neurotransmitters such as dopamine, norepinephrine and epinephrine to create mood swings. Other chemicals stimulate the immune cells to produce antibodies linked to autoimmune diseases.

**Conclusion:** There is a vicious cycle that goes from environmental toxins to endocrine and immune disruption to chronic diseases. Understanding the mechanisms through which toxic chemicals affect the human body offers opportunities for adequate treatments.

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