SUN CYCLES AND AUTOIMMUNE DISEASE

How variable solar cycles contribute to disease

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Alterations in peak solar intensity, which occur in cycles, contribute to the development of several disorders, including autoimmune disease.

The Solar Connection

Researchers at the Augusta Mental Health Institute in Maine have found a link between 11-year solar cycle peaks (changes in the sun's intensity) and autoimmune diseases, mental disorders and neoplasms. In particular, researchers studied the effects of sunlight and its variation on the human genome that could lead to disease. These researchers found that the influence on disease is strongest in the years in which the sun's ultraviolet (UV) radiation intensity showed the greatest variability (fluctuations in the levels of emitted UV radiation). These studies also found that these variations in the sun's UV radiation have more of an effect than variations in emitted ionizing ration.

In this study, researchers studied data from 237,000 patients collected over the past 71 years. They identified 7 distinct solar cycles with a greater association of autoimmune disorders, metabolic diseases, neoplasms, and mental/behavioral illnesses. The peak years of UV fluctuations and disease were found to occur approximately every 11 years. Solar cycles were characterized as chaotic (approximately three times as irradiant) or non-chaotic according to the Gutenberg-Richter power low and the uncertainty of predicting solar storms.

Birth Ratios

Studying the winter/summer birth ratios in different disease groups also compared the changes in solar intensity that occur during different seasons. This allowed researchers to determine if the season of birth during the peak years also contributed to disease. Overall, researchers found that radiation peaks in solar cycles, particularly chaotic solar cycles, are associated with a higher incidence of mental disorders, suggesting that fetal tissue is affected.

Autoimmune diseases were found to have intermediated sensitivity, which suggests that the effects of radiation aren't as intense as the effects seen in mental disorders. In autoimmune disorders such as rheumatoid arthritis and multiple sclerosis, a higher winter/summer birth ratio was seen, which supports the theory that lower vitamin D levels during fetal growth may play a role in the development of these disorders. Neoplasms and tumors, primarily arising in endoderm tissue, were suppressed by peak UV radiation intensity and more likely to occur in winter births.
Genetic Influences

The researchers in this study hypothesized that introns, which are the presumptive governors of gene control, modulate the effects of UV radiation, particularly when neoplasms or tumors develop. They also speculate that the variations in solar intensity evoke a reaction in the genome's ability to mutate and adapt to unpredictable solar peaks. The slight genetic instability (incidence of genetic mutations) that presumably evolved 80,000 years ago is suspected of allowing the human brain to adapt and develop its creativity and higher functioning, including abstract thought. Besides this mental creativity, genetic adaptability to environmental factors has apparently induced changes that affect natural selection, disease development and human aging.

Besides these changes in genetic adaptability, the immune system reacts to physical stress, including that of solar peaks, by producing different levels of immune system chemicals known as cytokines. These cytokines, particularly IL-6, contribute to autoimmune and mental disease development. Organisms react to chronic high-intensity UV radiation by producing more melanin and retaining various pigments. In the cycles that solar variability was most intense, these effects are particularly damaging to nuclear and mitochondrial DNA. Out of a total of six severe cycles occurring in the last 250 years, four of these cycles have occurred in the last 55 years, which may explain the increased number of autoimmune diseases and certain neoplasms associated with this timeframe.

Areas at Risk

The areas of the earth most subject to these variations are at 54+/- 10 degrees (north or south) latitude. Accordingly, the most potential damage from sunlight occurs between the Equator and Poles rather than at the Equator. Studies of the incidence of diabetes in Australia support these findings. Unsuccessful adaptation to this solar intensity, which could be associated with travel to new environments, results in mutations that lead to autoimmune and mental disorders and tumor formation, including non-Hodgkin's lymphoma.

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