Drugs can induce a temporary form of Lupus

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ABSTRACT

Lupus, also known as systemic lupus erythematosus (SLE), is an autoimmune disease that can affect multiple organs of the body and cause reddening of the skin. Lupus will infect multiple different organs which then cause red lesions on the skin. The immune system usually protects it-self from bacteria but an autoimmune disease is a state where the immune system attacks healthy cells as well, leading to a disease state. There Is not a clear single reason why it develops but it can be due to environmental factors or even medication prescribed. Here I reviewed the literature on autoimmune disease and medication correlation to it. Then I determined if using procainamide and hydralazine causes an autoimmune disease. In the course of this review, I found that approximately 10% of the 16,000 cases of SLE are related to drugs and there are over 100 different drugs like procainamide and hydralazine which are most likely to induce SLE (Chang et al. 2011). As procainamide acts on the lymphoid it interrupts Tcell growth which is a type of white blood cell that acts to kill diseases but it grows an affinity for healthy cells that don't have any disease antigen on the cell. For future research we want to look at how the prescribe medication alters the immune response causing it to attack healthy cells. We will be looking at the correlation of medication and how it can induce lupus.

METHODS

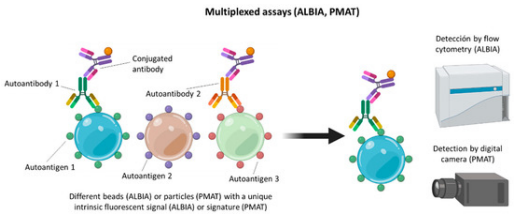
TNF alpha blockers induce autoantibodies which are antibodies that react with self-antigens. Antibodies will bind to foreign invaders like bacteria and helps fight off infection. Antibodies in lupus will bind to healthy antibody causing it to attack itself by binding with self-antigens. TNF alpha blockers work to solve RA by suppressing the immune system and suppress the effects of TNF agents. A commonly used TNF medication is adalimumab combined with prednisone a which is a anti-inflammatory. Prednisone works to go into the nucleus and bind to nuclear receptors to stop expression of proinflammatory cytokines. (NCBI 2022) As well it decreases circulation of lymphocytes and stimulates apoptosis in tumor cells (Pritchard 2021).

Drug induced lupus can be caused by medication like Procainamide and Hydralazine but there are genetic factors that can make a person more likely to get drug induced lupus. HLA-DR4 is a human genetic marker that is a leukocyte antigen (Transplant of the Liver 2015). Genes in our bodies can have defect that don't properly work causing our bodies to properly function and protect ourselves. HLA-DR4 is commonly found in white blood cells and when not properly functioning it cannot distinguish its own cells from invader cells. When HLA-DR4 cannot properly identify itself, it can attack itself which a form of a autoimmune disease. In DIL we see that a big cause for the disease is when the body attacks itself and it can be induced by medication or through a genetic defect. Having a combination of both can cause the patient to be at a higher risk for developing DIL. Patients who have HLA-DR4 tend to develop arthritis as well as you commonly see DIL, and RA paired together (Veraiche 2016.)

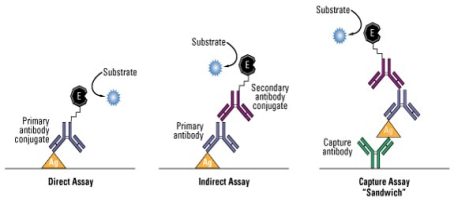
SPINULES AT EXCITATORY CORTICAL SYNAPSES

Hydralazine induced lupus is characterized by fever, anorexia, fatigue, joint swelling, and a rash. Having one symptom does not automatically characterize having hydralazine induced lupus (HIL) however a combination of multiple characteristics does. Hydralazine can cause the attack of histones from antibodies. If a patient has positive ANA's and positive anti histone antibodies (AHA) which is a specific ANA this can better identify DIL. Histone antibodies are autoantibodies produced by the immune system that targets its own histones. Histones are proteins within our DNA wrapped by nucleosome this complex is what allows for gene expression (Testing 2022). Antibodies will bind to histones because they are able to active immune cells. When activated by histones a inflammation response can causing cell stress which is a pathway that causes T cells to assess if the cell is infected. A patient has had no previous diagnoses with a autoimmune disease and gets treated for hypertension with hydralazine greater than 100mg per day. A few months later the patient has a autoimmune disease along with physical fatigue and positive ANA and AHA. This would give strong conclusion of DIL and can warrant a stop in use of the medication regardless of having hypertension. If the patient stops using hydralazine and symptoms go away it would conclude DIL.

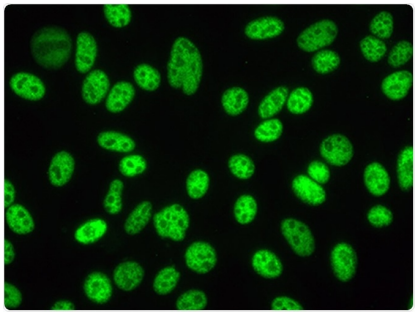
Antibody Quantification



The binding of an antibody on a cell indicates the result of an immune reaction. High antibodies can indicate a attack on itself, on healthy cells when antibodies are present for long periods of time.



Test are done through ELISA test where you have your conjugate body that will bind to your sought after antibody. If the two bind you will often get a presence of a color indicating our antibody is present.



The fluorescence of green shows the presence of our antibodies in cells. The type of conjugate antibody will show if it is IgM, IgG, or IgA which are antibodies that are present in different locations of the body. IgA is often found in the gut.

PRELIMINARY CONCLUSIONS

Having one symptom that is commonly seen in DIL does not diagnose DIL. Drug induced lupus should be identified by using multiple test to better characterize DIL. Starting with the history of the person taking the medication like procainamide or hydralazine. If the patient has a history with a autoimmune disease like rheumatoid arthritis or diabetes it can be possible the disease is becoming more severe. If the patient has no history with autoimmune disease and is now having symptoms after taking procainamide or hydralazine it is more likely they have DIL. Along with having physical characteristics like swelling of joints and fatigue this can draw a clearer diagnosis of DIL. Then a ANA test would be done having positive antinuclear antibodies and positive anti histone antibodies show DIL. There are multiple forms of ANA like being AHA positive where you have anti histone antibodies. AHA will attack histone in our body which are used to express DNA. If histones are attack it can impact the expression of genes and alleles like the HLA-DR4 gene which can cause the patient to be more susceptible to DIL. As well understanding if any genetic abnormalities are present cause see if the patient is more likely to deduce DIL. If a patient is HLA-DR4 positive they are more likely to have its autoimmune system attack itself and form a temporary autoimmune disease. Multiple characteristics should be tested to better identify if DIL is occurring because treatment would have to stop. Multiple characteristics better diagnose DIL. This is important to properly diagnose because the patient would have to stop taking the medication used for hypertension and that impacts other aspect of the patient's health.