EFFECT OF MARIJUANA USE ON THYROID FUNCTION AND AUTOIMMUNITY
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INTRODUCTION

• Medicinal Cannabis use has been legalized in twenty four states thus far.
• Hillard and Lomax have shown that acute administration of the tetrahydrocannabinol (THC) in mice reduces the levels of T4 and TSH by as much as 90% for up to 6 hours. When THC is taken chronically, however, the thyroid depressant effect is lost, which may indicate the development of tolerance (1, 2).
• In human subjects there are two conflicting reports on the chronic effect of marijuana use on thyroid function, but acute effects of marijuana have not been studied. (3)
• Furthermore, several studies have shown that cannabis has immune modulatory effects in other autoimmune conditions, but to our knowledge no data is available on the effect of cannabis on autoimmune thyroiditis.
• We conducted a two year cross sectional analysis of National Health and Nutrition Examination Survey (NHANES) data (2009-2010 and 2011-2012) collected by the Center for Disease Control and Prevention (CDC).

METHODS

• Two periods of NHANES data (2009-2010, 2011-2012) on self reported marijuana use, thyroid function tests, and α-TBG and α-TPOA levels were merged for this analysis.
• Questions were self-administered using the ACASI, assessing lifetime marijuana use, timing and frequency of use.
• We categorized subjects into two groups: 1) recent marijuana users (used within 30 days of testing) and 2) past users (more than 30 days of testing) or non-users.

RESULTS

• A total of 4851 subjects who responded to NHANES questionnaire regarding marijuana use from two NHANES data sets were analyzed.
• A total of 53% of the subjects reported lifetime cannabis use with 18 % reporting recent use in the last 30 days.
• There were weak but statistically significant inverse correlations between recent marijuana use and thyroid antibody levels: α-TBG and α-TPOA levels were lower in marijuana users (α-TBG & α-TPOA = r = -0.57, p = 0.003 and r = -0.05, P = 0.02, respectively), while free T3 showed a significant positive correlation (r = 0.05, P = 0.04) (Table 2)

DISCUSSION

• Our data suggests that marijuana use may have immune modulatory effects on the thyroid gland.
• It is well known that endocannabinoid receptor-2 (CB2) activation is linked to suppression of immunity and has been implicated in several autoimmune disorders including multiple sclerosis, rheumatoid arthritis, colitis and hepatitis and recently in uveitis.
• However, involvement of CB2 in thyroid autoimmune has not been reported in human or animals yet.
• The mechanism by which CB2 activation leads to inhibition of the humoral immune response may be through direct effects on immune cells as well as by changing the expression of various cytokines. Studies have suggested that exogenous cannabinoids elicited a shift in the cytokine expression profile from the Th1 pro inflammatory to anti-inflammatory Th2. (4)
• In conclusion, our data suggests that THC may have a role in modulating thyroid autoimmunity with clinical implications for a possible protective association between THC and Hashimoto’s Thyroiditis, or Autoimmune Acquired Hypothyroidism. Clinical trials evaluating the effects of acute and chronic marijuana administration on thyroid autoimmunity and function are necessary.

REFERENCES