


Case Report: Psychiatric Symptoms Associated With the Moderna mRNA COVID-19 Vaccine Administration and Their Resolution

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ABSTRACT: This case report describes the sudden presentation and successful cessation of psychiatric symptoms following the first administration of the Moderna mRNA vaccine against the SARS-CoV-2 virus during early 2021. The process of discovery of symptoms is described, along with an empirical procedure which identified St. John's wort as the mediating agent. Implications for self-medication of mild depression are discussed. Hypericin, a constituent agent in St. John's wort, interacts with the SARS-CoV-2 spike protein. Sensitization to hypericin following vaccine administration is consistent with the observed symptoms.

KEYWORDS: Moderna, COVID19, mRNA vaccine, St John's wort (*Hypericum perforatum*), hypericin

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Introduction

Both clinical and biochemical evidence are consistent with the potential of vaccines to alter a person's response to foods or other substances that have been ingested. Immune response and sensitization occurs infrequently. What follows is a single case reporting psychiatric symptoms after the administration of the initial version of the Moderna mRNA COVID-19 vaccine and a subsequent sensitization to the herbal remedy St. John's wort. For a general review of COVID-19 vaccine complications and sequelae, see for example Mushtaq et al.¹

After vaccine administration, the subject of the case study noted her psychiatric symptoms and sought out medical care, and was able to determine via trial and error herself that the supplement was likely the source. These resolved once the supplement was discontinued. The case report details a mechanism for how the vaccine may have impacted her body's immune response and led to sensitization to St. John's wort.

Case Report

The subject is a 50 year old female with a healthy lifestyle: that is, diet is healthy and exercise is moderate, socializing is well integrated. She is a small business owner, and employs a half dozen employees in the hospitality sector. She has undertaken several years of self-treatment for mild depression with over the counter remedies, currently (at the time of these events) taking St. John's wort (*Hypericum perforatum*) in a single dose of 900 mg/day. Like many of this generation, she has a habit of regular (near daily) alcohol use, with excess (or binge) drinking occurring fewer than five times per month, and work is not impacted. Tobacco and infrequent cannabis use were present decades earlier and are now rare. She has a stable primary romantic partnership and her standing and relations in the community are extremely good.

In early 2021 the subject received her first dose of the Moderna COVID-19 vaccine. Over the course of the following week the subject experienced the following symptoms: agitation, hyperkinesia, dysphoria, confusion, frontal headache, nausea, excessive thirst, and heart rate increase. Symptoms were intermittent, but were severe enough to warrant a visit to the local hospital for evaluation. The health team were in the process of preparing IV sedation for the subject, when the patient's partner advised her of these plans, and she determined to quickly leave the hospital, which she did.

Online research by the subject returned the possibility of psychosis from St. John's wort, which did not fit her symptoms, and Serotonin Syndrome, which did. Cessation of St. John's wort was attempted, and the condition resolved itself in a few days with no lasting difficulty. Previously there had been good toleration of this herb, but after the administration of the mRNA vaccine, the subject's response was such that further use was not tenable. The second vaccine dose was administered a month later without issue.

Discussion

St. John's wort is an over the counter herbal remedy that has been used in wild form in Europe for centuries to address mild to moderate symptoms of depression. It contains several compounds that have potential for psychiatric effect: for example, hypericin, hyperforin, and polyphenols.² One recent meta-analysis shows its efficacy is comparable with that of selective serotonin reuptake inhibitors SSRIs³ but longterm safety and benefits still require additional study.

The herb's constituent hypericin can be derived from anthraquinone and is an organic chemical with 2 hydrogen, 2 oxygen, and 6 hydroxy radicals on its margins, as shown in Figure 1. It has documented action on viruses with protein envelopes.⁴



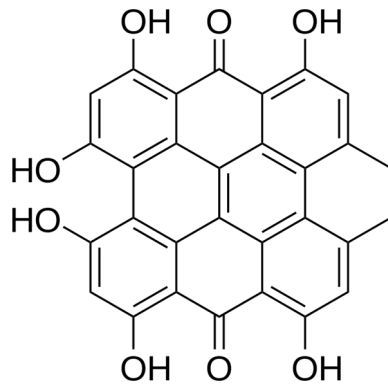


Figure 1. Chemical model of hypericin.⁸

For example, it inhibits viral assembly and release of enveloped viruses⁵; and inhibits fusion.⁵⁻⁷

Hypericin is also a lead compound for a moderate protease inhibitor of the spike protein of the SARS-CoV-2 virus.⁹ This is the same spike protein that the COVID-19 mRNA vaccines target. Pitsillou et al⁹ found that hypericin docks with the spike protein via hydrogen bonding and a pi-pi cation (Glide Energy = -38.0 kcal/mol), and its effects in vivo inhibit the action of the spike protein. It is currently being studied for drug development to combat the virus.

A schematic of the information presented above is listed in Figure 2. Hypericin is one of the compounds present in St. John's wort (*Hypericum perforatum*). It has been shown to bond to the spike protein that the COVID-19 mRNA vaccine produces. The following events are consistent with what was observed: The vaccine provoked an immune reaction to the spike protein. The mechanism of sensitization to hypericin was the docking of hypericin to the spike protein.

Symptom cessation and return to healthy functioning occurred after the subject formed a reasonable hypothesis that psychiatric symptoms might alleviate if treatment was stopped. There is precedence in the literature for allowing those with psychiatric distress to play an active role in determining a course of action.¹⁰ Others taking St. John's wort for management of psychiatric symptoms might be made aware of this possibility during medical consultation.

Note also that previous reports have described mental health issues such as bipolar disorders¹¹ following to SARS-CoV-2 infection. In general, care should be taken to determine causative hypotheses and rule out other possible associations. The sensitization of a patient to pharmacological agents after vaccination or infection with the SARS-CoV-2 virus presents a more complicated picture of treatment. The procedure described above, namely trial and error based on reasonable hypotheses highlights the importance of insight and individualized care.

The discussion above shows a consistent mechanism that explains both symptom arrival and cessation in this patient. The docking of the hypericin molecule with the SARS-CoV-2 spike protein is consistent with the presentation.

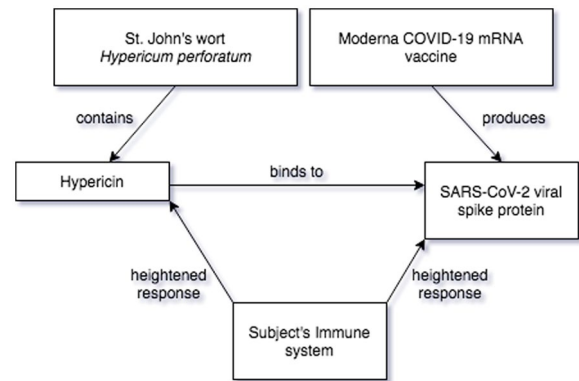


Figure 2. Schematic of the interaction of the Moderna mRNA vaccine response.

Acknowledgements

This case report grew out of a simple conversation that led to the interview on which the report is based. Love always to my parents.

Author Contribution

DH was responsible for all the contributions, including the Conceptualization, Writing – Original Draft Preparation, and Writing – Review & Editing.

Ethical Approval

This falls outside the requirements of IRB approval as no treatment was administered and no “research on human subjects” was undertaken by the author.

Consent

Consent for the interview and report was given in writing and verbally by the subject and checked three times during the interview, and again twice more during the process of writing up the report and submitting it. The subject felt it was important for this information to be made public.

Data Availability Statement

The very brief notes of the interview on which this study is based are available on request from the author. The data are not publicly available due to their containing information that could compromise the privacy of interviewee.

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