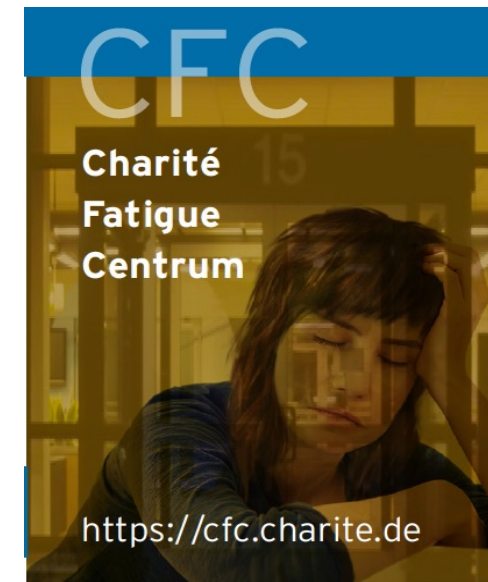


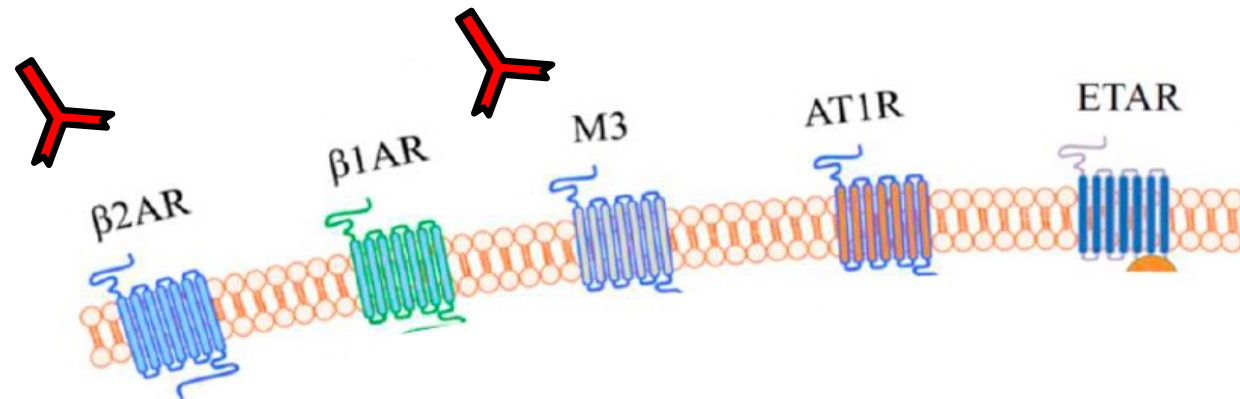
Immunoabsorption in Post Covid Syndrom and ME/CFS

12.05.2023

Elisa Stein
Institute of Medical Immunology
Charité, Berlin



GPCR Autoantibodies

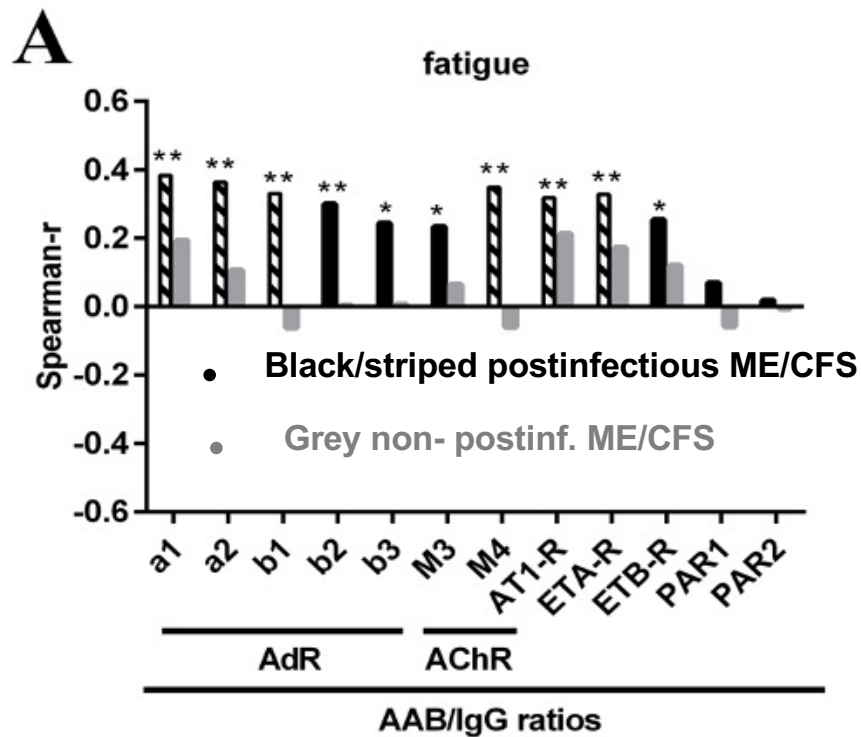


- **natural autoantibodies**
- **β2 adrenergic receptor antibody function impaired in ME/CFS**
- **Correlation of elevated AAB levels with symptom severity in ME/CFS**
- **Clinical trials targeting autoantibodies first evidence in ME/CFS**

1. Loebel M, et al. Antibodies to β adrenergic and m cholinergic receptors in patients with ME/CFS. Brain Behav Immun. 2016
2. Hartwig J, et al. IgG stimulated β2 adrenergic receptor activation is attenuated in patients with ME/CFS. Brain Behav Immun Health. 2020
3. Freitag H, et al. Autoantibodies to Vasoregulative GPCR correlate with Symptom Severity, Autonomic Dysfunction and Disability in ME/CFS. J Clin Med. 2021
4. Scheibenbogen C, et al. Immunoabsorption to remove β2 adrenergic receptor antibodies in ME/CFS. PLoS One. **2018**
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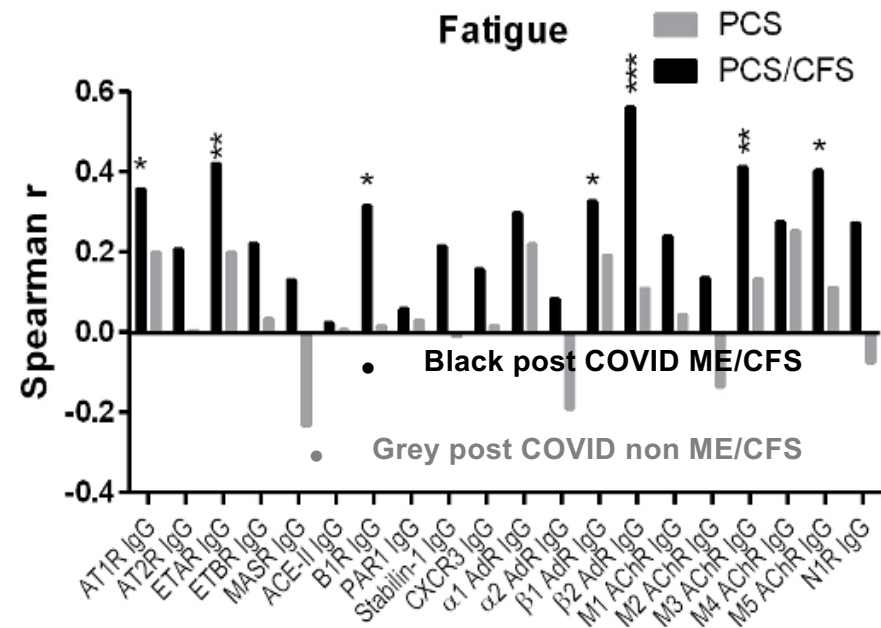
Correlation of GPCR antibody levels with symptom severity in postinfectious and post COVID ME/CFS

- Postinf ME/CFS



*Freitag et al. JCM 2021

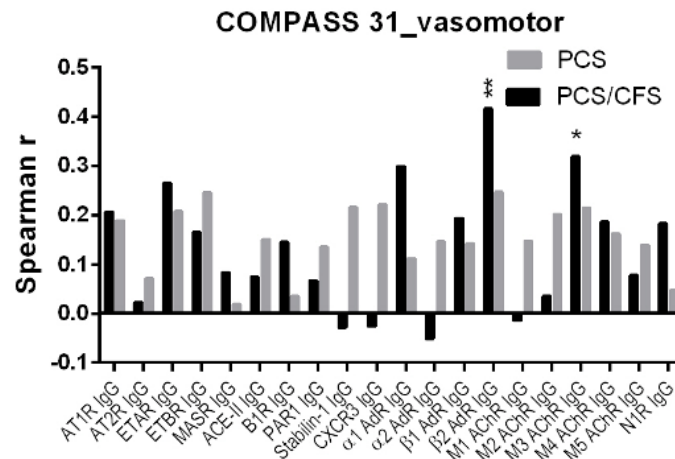
- Post COVID ME/CFS month 6 - 9



Sotzny F. et al. Frontiers Immunology, 2022

Correlation of GPCR autoantibodies with symptom severity in PCS ME/CFS

Correlation of β 2R, M3 AchR with Raynaud symptoms in PCS/ME/CFS but not non-ME/CFS/PCS



Sotzny F, et al Autoantibodies targeting GPCRs and RAS-related molecules are dysregulated in PCS and correlate with symptom severity, Frontiers Immunology, 2022

Observational study on immunoadsorption in ME/CFS



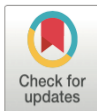
RESEARCH ARTICLE

Immunoadsorption to remove β_2 adrenergic receptor antibodies in Chronic Fatigue Syndrome CFS/ME

Carmen Scheibenbogen^{1,2*}, Madlen Loebel¹, Helma Freitag¹, Anne Krueger³, Sandra Bauer¹, Michaela Antelmann¹, Wolfram Doehner⁴, Nadja Scherbakov⁴, Harald Heidecke⁵, Petra Reinke^{2,3}, Hans-Dieter Volk^{1,2}, Patricia Grabowski¹

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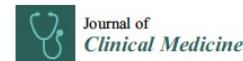
OPEN ACCESS

Citation: Scheibenbogen C, Loebel M, Freitag H, Krueger A, Bauer S, Antelmann M, et al. (2018) Immunoadsorption to remove β_2 adrenergic receptor antibodies in Chronic Fatigue Syndrome CFS/ME. PLoS ONE 13(3): e0193672. <https://doi.org/10.1371/journal.pone.0193672>

Abstract

Introduction

Infection-triggered disease onset, chronic immune activation and autonomic dysregulation in Chronic Fatigue Syndrome/Myalgic Encephalomyelitis (CFS/ME) point to an autoimmune disease directed against neurotransmitter receptors. We had observed elevated autoanti-



Article

Myalgic Encephalomyelitis/Chronic Fatigue Syndrome: Efficacy of Repeat Immunoadsorption

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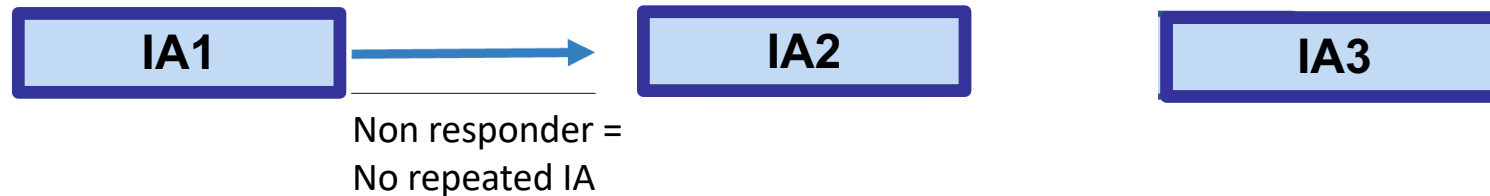


Abstract: (1) Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS) is a complex neuroimmunological disease. There is evidence for an autoimmune mechanism for ME/CFS with an infection-triggered onset and dysfunction of β_2 -adrenoreceptor antibodies (β_2 AR-AB). In a first proof-of-concept study, we could show that IA was effective to reduce β_2 AR-AB and led to improvement of various symptoms. (2) Five of the ME/CFS patients who had clinical improvement following treatment with a five-day IA were retreated in the current study about two years later with a modified IA protocol. The severity of symptoms was assessed by disease specific scores during a follow-up period of 12 months. The antibodies were determined by ELISA. (3) The modified IA treatment protocol resulted in a remarkable similar clinical response. The treatment was well tolerated and 80–90% decline of total IgG and β_2 AR-AB was achieved. Four patients showed a rapid improvement in several clinical symptoms during IA therapy, lasting for six to 12 months. One patient had no improvement. (4) We could provide further evidence that IA has clinical efficacy in patients with ME/CFS. Data from our pilot trial warrant further controlled studies in ME/CFS.

Observational study on immunoadsorption in PCS and ME/CFS

Primary endpoint:
SF-36 PF* ≥ 10 points at week 4

PF* = physical function



Inclusion criteria

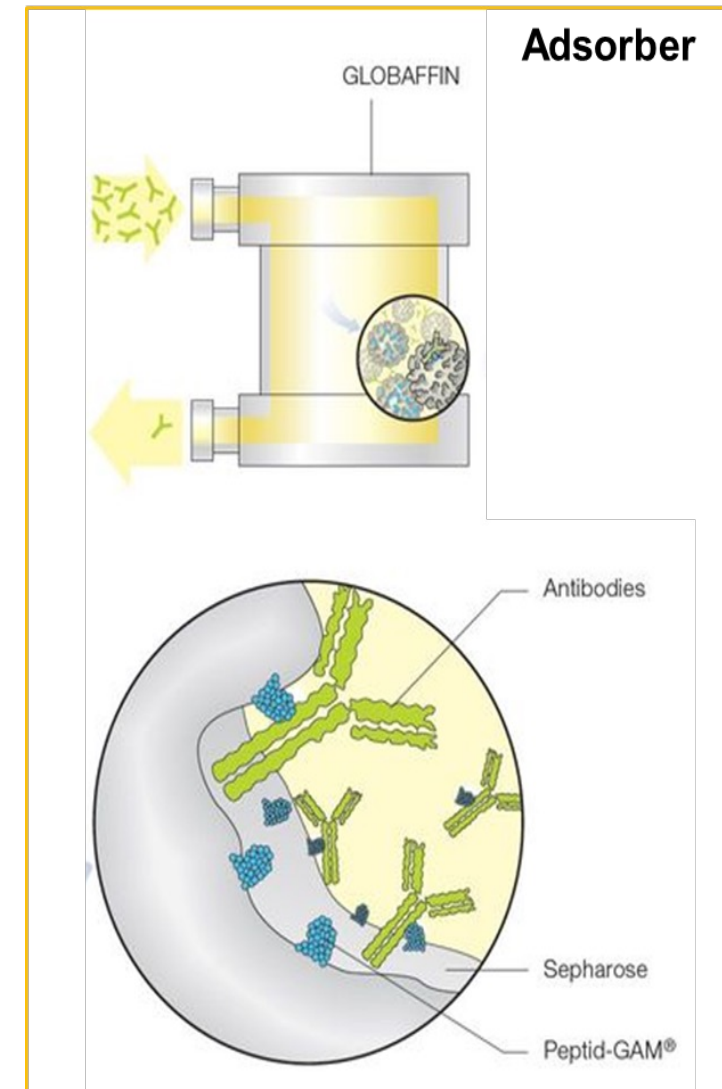
- Age 18-65
- Post COVID ME/CFS Canadian Consensus Criteria (CCC)
- elevated $\beta 2$ adrenergic receptor autoantibodies
- Immunoadsorption with TheraSorb® for 5 days

Patient No	Gender	Age	ME/CFS Onset	Disease severity Bell Score before IA	Disease severity SF-36 PF before IA	Disease severity SF-36 PF after IA	Responder
1	m	33	10/2020	30	25	30	no
2	m	59	03/2020	30	35	65	yes
3	w	36	01/2022	20	15	25	yes
4	w	52	12/2020	40	45	80	yes
5	w	59	05/2020	30	20	35	yes
6	m	36	04/2022	30	40	50	yes
7	m	41	11/2020	30	25	70	yes
8	w	37	11/2021	30	40	25	no
9	w	44	11/2021	30	5	5	no
10	w	56	11/2021	40	25	65	yes

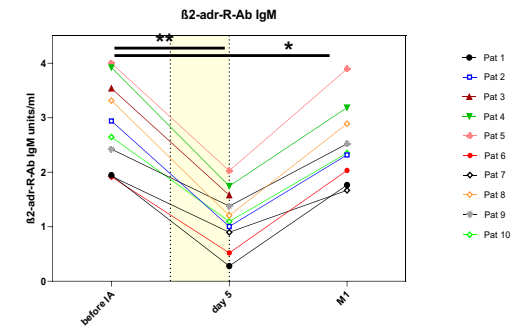
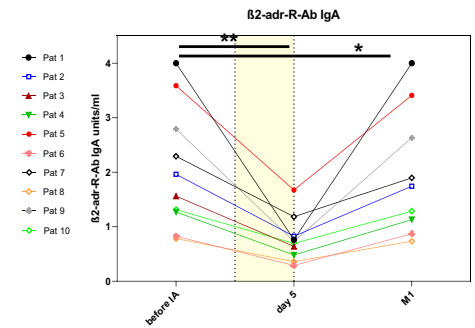
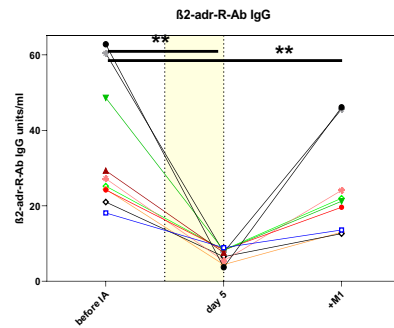
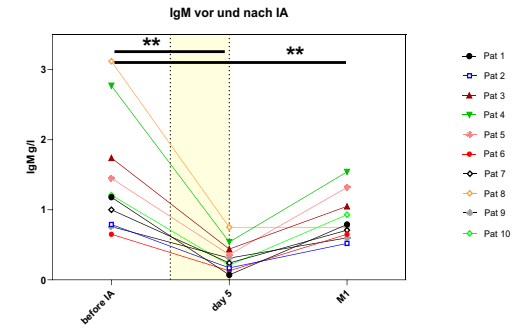
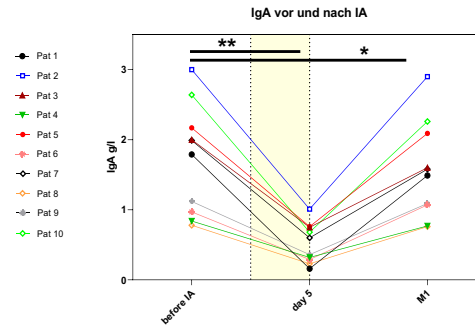
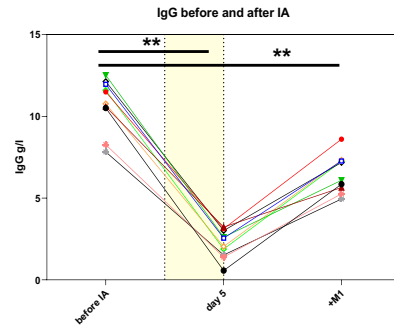
Immunadsorption

Procedure

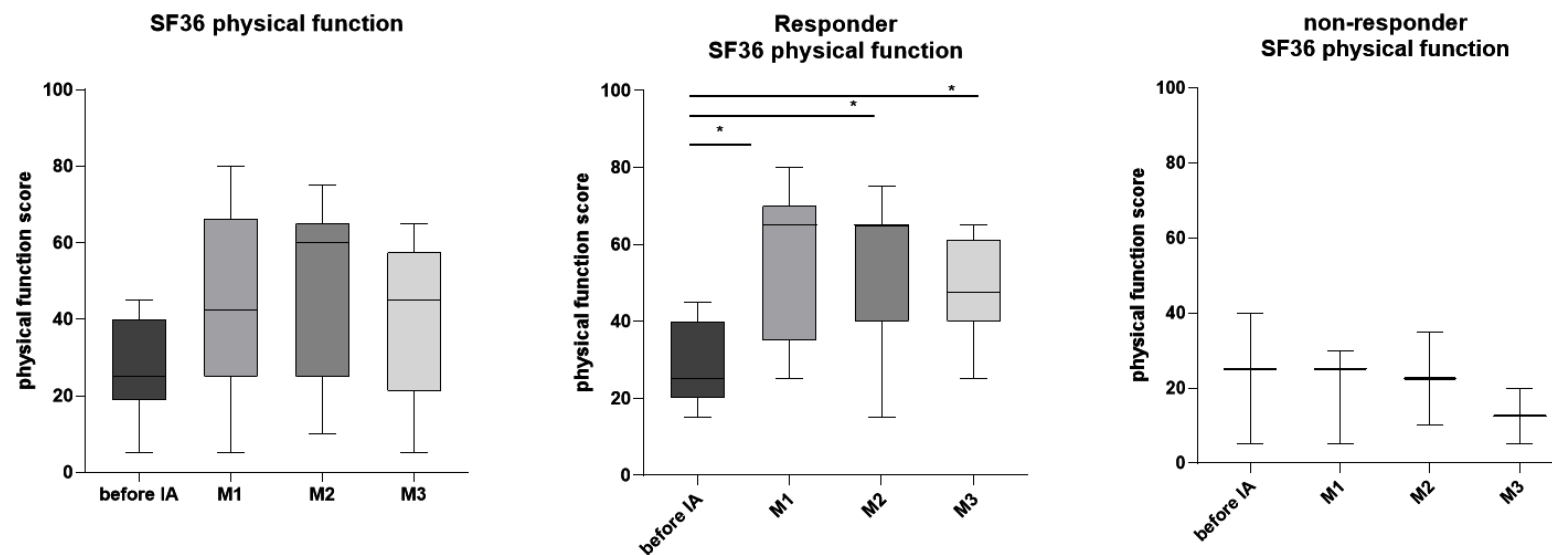
- Separates blood cells from plasma
- Removes immunoglobulines via adsorber columns
- Is effective in autoimmune diseases



Observational study on immunoadsorption in PCS and ME/CFS

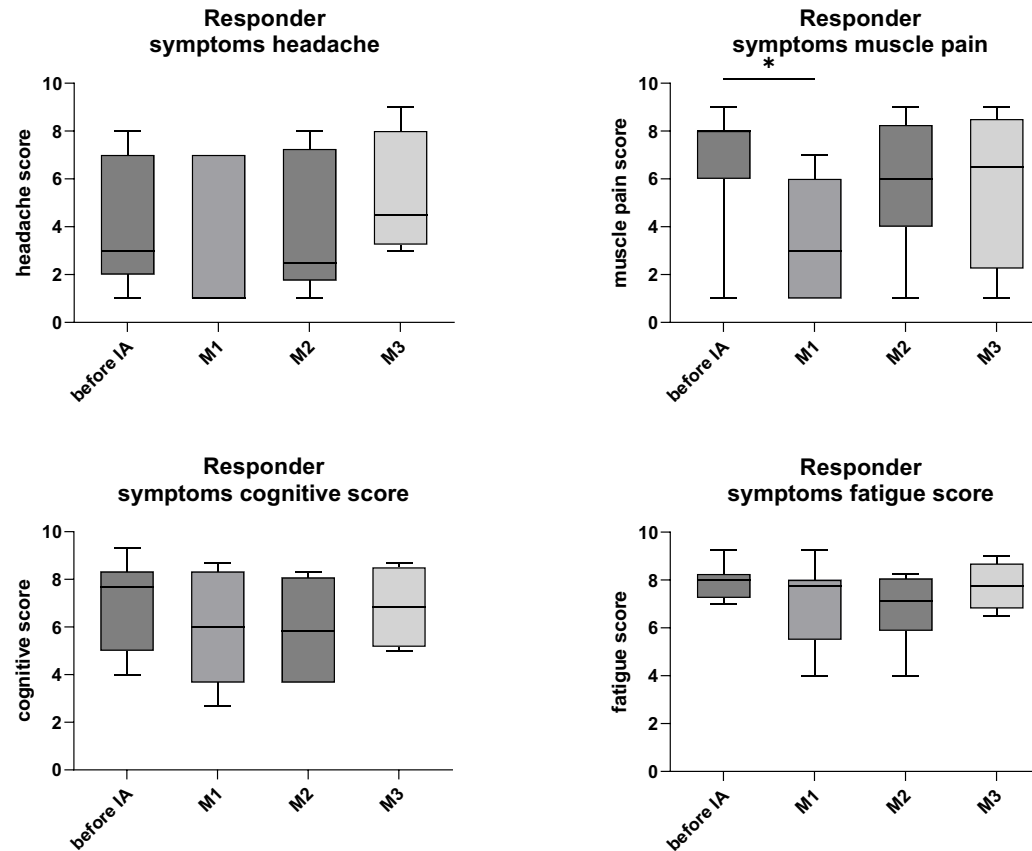


Observational study on immunoadsorption in PCS and ME/CFS



For statistical analysis Wilcoxon test was performed and median with interquartile range is shown. Follow up data were analysed compared to data before treatment. (* $p \leq 0.05$, ** $p \leq 0.01$)

Observational study on immunoadsorption in PCS and ME/CFS



For statistical analysis Wilcoxon test was performed and median with interquartile range is shown. Follow up data were analysed compared to data before treatment. (* $p \leq 0.05$, ** $p \leq 0.01$)

Observational study on immunoadsorption in PCS and ME/CFS

Conclusion: immunoadsorption is effective in patients with post-COVID fulfilling ME/CFS criteria and elevated β 2-adrenergic-autoantibodies.