Creating international and interdisciplinary collaboration for health

AONM Newsletter August 2023

Introduction

It is often the neurological symptoms that seem to be the most persistent in what has come to be termed "PASC" - Post-acute sequelae of SARS-CoV-2. The downregulation of the mitochondria is certainly a huge factor, and the phenomenon profiled in our first article has both mitochondrial stress and oxidation as central features. The topic is disturbance to cholinergic pathways, and this has long been identified in M.E. as well, as far back as the 1990s. Hopefully the research now being pursued so vehemently into Long Covid will open up new avenues in the field of M.E., too.

This newsletter also covers a number of new tests that AONM is now able to offer. Please do check out our shop, as many of our tests are now available from there, though of course our Helpline will always continue to provide the full service you are used to.

Please see our upcoming events section for information on the exciting events ahead over the next quarter, organised both by AONM as well as our affiliates.

As always, we welcome your feedback: please contact us on info@aonm.org

CONTENTS

1. New insights into neuromodulation in Long COVID

There is increasing coverage of the connection between the nAChRs (nicotinic acetylcholine receptors) and the modulation of Long Covid. Professor Jeanne-Pierre Changeux, Professor of Neuroscience at the Pasteur Institute, who first identified and purified the nicotinic acetylcholine receptor, posed the hypothesis soon after the onset of the Pandemic in April 2020 in "*A nicotinic hypothesis for Covid-19 with preventive and therapeutic implications*"(i). This was followed by

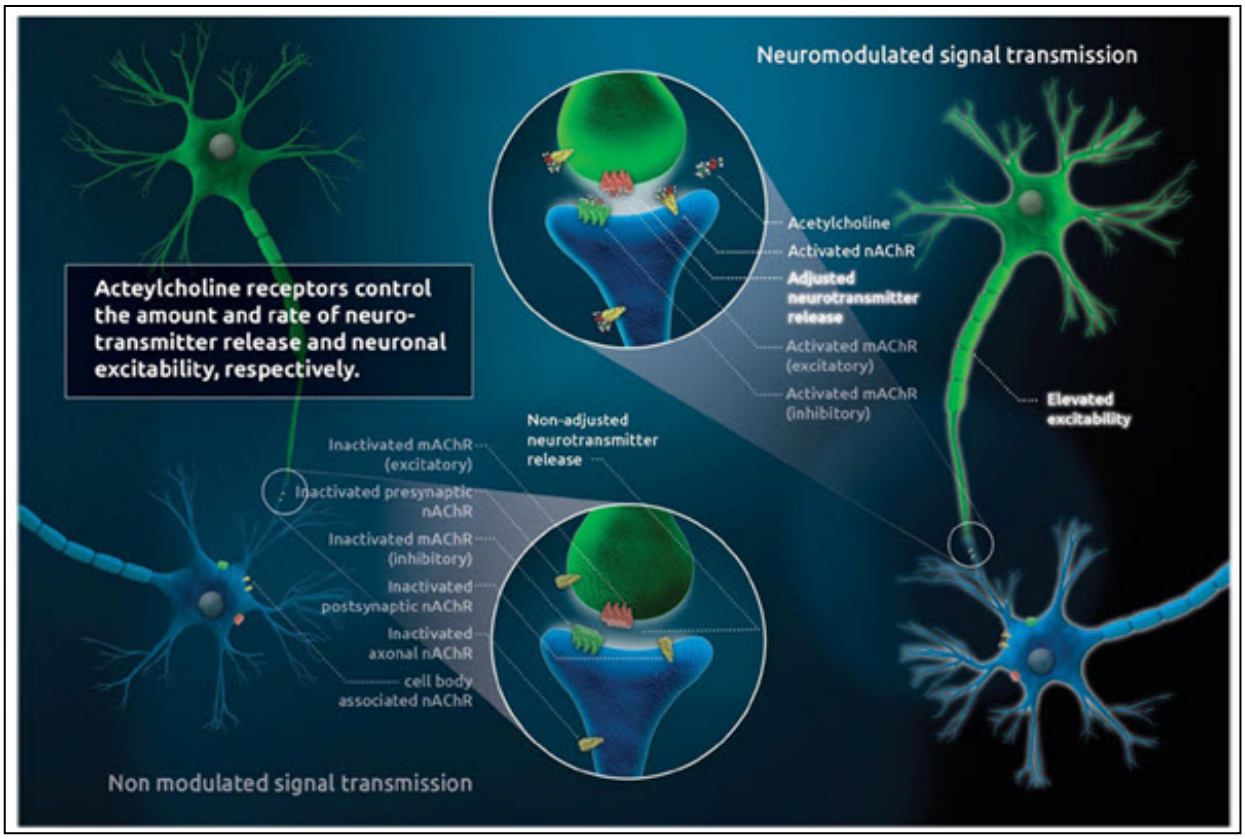


Fig. 1 from the seminal Leitzke study mentioned below describing the difference between non-modulated and neuromodulated signal transmission via nAChRs

further peer-reviewed studies such as "*A potential interaction between the SARS-CoV-2 spike protein and nicotinic acetylcholine receptors*" and "*The SARS-CoV-2 Virus and the Cholinergic System: Spike Protein Interaction with Human Nicotinic Acetylcholine Receptors and the Nicotinic Agonist Varenicline*"(ii).

It appears that the SARS-CoV-2 related spike protein attaches not only to ACE-2 receptors but also to nAChRs. "The nAChR is responsible for coordinated neuronal network interaction"(iii), and viral attachment to this will "compromise integrative interneuronal communication substantially"(iv).

Lagoumintzis et al wrote in March 2021 in "*Nicotinic cholinergic system and COVID-19"*: "Our findings provide further support to the hypothesis about the protective role of nicotine and other cholinergic agonists."(v) In their response to the BMJ Editor (https://www.bmj.com/content/368/bmj.m.406/rr-35), K. Farsalinos and K. Poulas suggest that "it is, perhaps, timely to propose a clinical trial of pharmaceutical nicotine in COVID-19 patients." A recent article by Leitzke from Jan. 2023(iv) now provides further evidence as well as convincing case studies that the agonist ligand nicotine, which has a 30-fold higher affinity to nACHrs than acetylcholine, may be able to displace the spike protein (viral spike glycoprotein - SGP - segments) from nACHR attachment. The cases presented, using a 7.5 mg patch attached for only six days, all "witnessed improvements ranging from immediate and substantial to complete remission in a matter of days."

It needs pointing out that the UK's Royal Society for Public Heath noted in 2015 that "nicotine by itself is fairly harmless"(vii), it is the other damaging chemicals it is combined with in cigarettes that make it harmful. The nicotine was applied transdermally in patches in the Leitzke studies cited above, removing the dangers of inhalation.

There is also a role for niacin itself as a direct precursor of NAD+(viii). Dr. Wentzel, one of the authors of "*COVID-19: NAD+ deficiency may predispose the aged, obese and type2 diabetics to mortality through its effect on SIRT1 activity*", talks about "Covid-induced secondary Pellagra" and has seen significant improvement from using B3 in its specific niacin form, together with other supplements he mentions(ix).

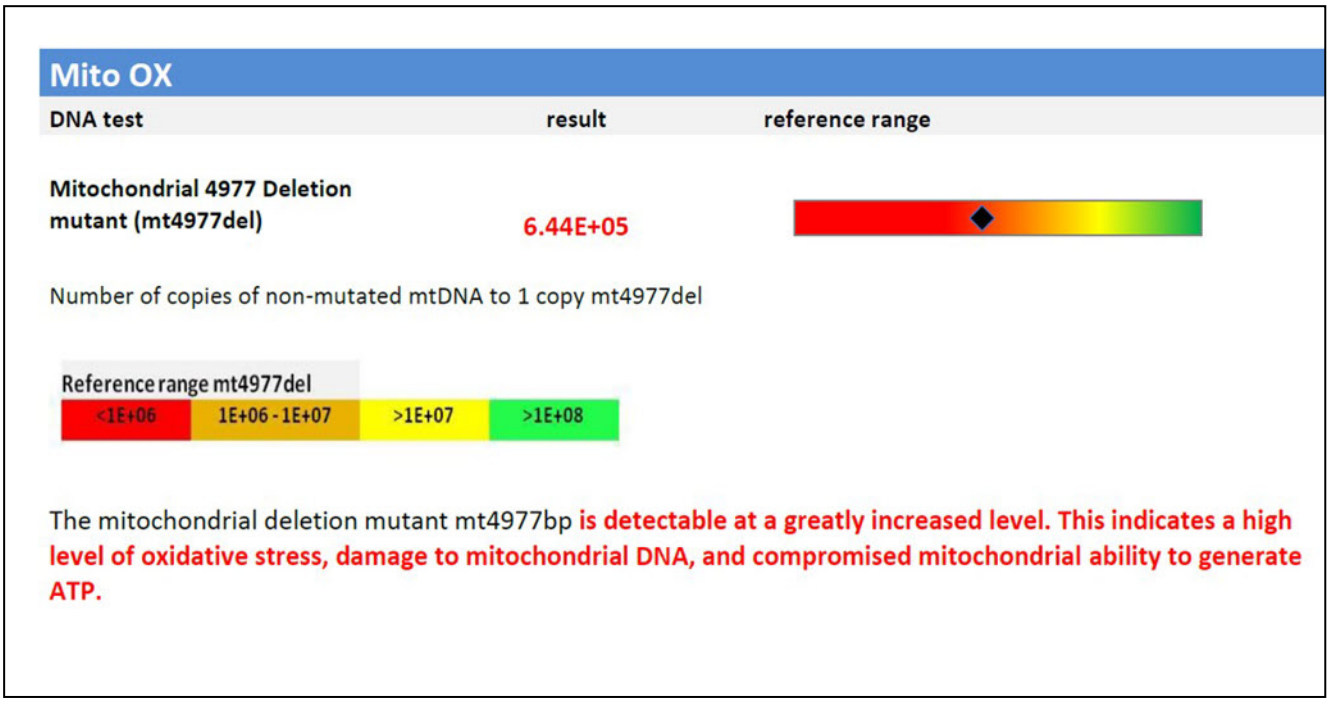
As the October 2020 Ten Hove article on the role of nicotinic receptors in SARS-CoV-2 explains, "vagus nerve stimulation (VNS) activates nAChRs"(x), so there is latitude for much more to restore health post-Covid than just the previous initiatives outlined.

It has long been suspected that ME/CFS, too, is characterised by disturbance to cholinergic pathways.(xi)(xii). A recent discovery that mitochondria express a range of AChR subtypes,

including the nicotinic α3 subunit receptor, suggests that nAChR may impact mitochondrial function directly to regulate oxidative stress. "In the face of dysregulation in several neurotransmitters, including acetylcholine, the mitochondrial stress associated with the activation of these nicotinic receptors would lead to an alteration in intracellular dynamics in several immune cells, including NK cells."(xiii) Maybe these same initiatives that are already proving miraculous improvements (in some cases) for Long Covid will also prove useful for ME/CFS.

i. Changeux JP, Amoura Z, Rey FA, Miyara M. A nicotinic hypothesis for Covid-19 with preventive and therapeutic implications. C R Biol. 2020 Jun 5;343(1):33-39.
ii. Carlson EC, Macsai M, Bertrand S, Bertrand D, Nau J. The SARS-CoV-2 Virus and the Cholinergic System: Spike Protein Interaction with Human Nicotinic Acetylcholine Receptors and the Nicotinic Agonist Varenicline. Int J Mol Sci. 2023 Mar 15;24(6):5597.
iii. Leitzke M. Is the post-COVID-19 syndrome a severe impairment of acetylcholine-orchestrated neuromodulation that responds to nicotine administration? Bioelectron Med. 2023 Jan 18;9(1):2.
iv. Ibid
v. Lagoumintzis G, Chasapis CT, Alexandris N, Kouretas D, Tzartos S, Eliopoulos E, Farsalinos K, Poulas K. Nicotinic cholinergic system and COVID-19: In silico identification of interactions between α7 nicotinic acetylcholine receptor and the cryptic epitopes of SARS-Co-V and SARS-CoV-2 Spike glycoproteins. Food Chem Toxicol. 2021 Mar;149:112009.
vi. Op. ed.
vii. https://www.rsph.org.uk/about-us/news/nicotine--no-more-harmful-to-health-than-caffeine-.html
viii. Miller R, Wentzel AR, Richards GA. COVID-19: NAD+ deficiency may predispose the aged, obese and type2 diabetics to mortality through its effect on SIRT1 activity. Med Hypotheses. 2020 Nov;144:110044.
ix. https://www.youtube.com/watch?v=C3w7skYHcSg&t=45s
x. Ten Hove AS et al. The role of nicotinic receptors in SARS-CoV-2 receptor ACE2 expression in intestinal epithelia. Bioelectron Med. 2020 Oct 28;6:20.
xi. Lidbury BA, Fisher PR. Biomedical Insights that Inform the Diagnosis of ME/CFS. Diagnostics (Basel). 2020 Feb 8;10(2):92.
xii. https://me-pedia.org/wiki/Acetylcholine
xiii. Cortes Rivera M, Mastronardi C, Silva-Aldana CT, Arcos-Burgos M, Lidbury BA. Myalgic Encephalomyelitis/Chronic Fatigue Syndrome: A Comprehensive Review. Diagnostics (Basel). 2019 Aug 7;9(3):91.

2. NEW: Mitochondrial stress test via fingerprick



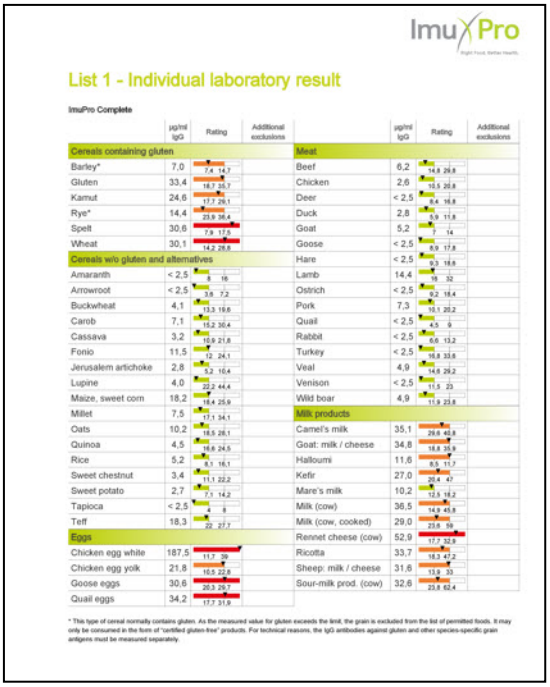
Oxygen is the most vital component of our energy generation, and there should normally be sufficient antioxidant enzymes and antioxidants inside the mitochondria to quench the oxygen stress created. However, mitochondrial DNA can easily get damaged if not enough antioxidants are available to protect it. The damage from oxygen radicals can also affect the complexes of the electron transport chain inside the mitochondria (which produce most of our energy currency, adenosine triphosphate – ATP), and even compromise the mitochondrial membrane.

The 4977 deletion is a well-researched marker for oxidative stress. This mitochondrial stress test is a quantative test that indicates whether any sections of mitochondrial DNA have been compromised, and – if so – how many. The loss of a section of DNA is designated a deletion. This test uses the number of copies of this 4977 deletion to assess how extensive the mitochondrial oxidative stress is. The damage is reversible as once the impaired mitochondria have been eliminated, new intact mitochondria can be generated in their place.

There can of course be multiple reasons for excessive oxidative stress, but if it has actually begun to affect mitochondrial DNA, that is a serious condition that needs catching before it has progressed too far.

This can now be done as a fingerprick test. It can function as a follow-up test to monitor the effects of therapy, and is also extremely useful to detect over-training in athletes.

3. AONM's new enhanced test of food hypersensitivity



ImuPro

List 1 - Individual laboratory result

ImuPro Complete

	µg/ml IgG	Rating	Additional exclusions
Cereals containing gluten			
Barley*	7,0	7.4 14.7	
Gluten	33,4	18.7 35.7	
Kamut	24,6	17.7 29.1	
Rye*	14,4	23.9 36.4	
Spelt	30,6	7.9 17.5	
Wheat	30,1	14.2 28.8	
Cereals w/o gluten and alternatives			
Amaranth	< 2,5	8 16	
Arrowroot	< 2,5	3.8 7.2	
Buckwheat	4,1	13.3 18.6	
Carob	7,1	15.2 30.4	
Cassava	3,2	10.9 21.8	
Fonio	11,5	12 24.1	
Jerusalem artichoke	2,8	5.2 10.4	
Lupine	4,0	22.2 44.4	
Maize, sweet corn	18,2	18.4 25.9	
Millet	7,5	17.1 34.1	
Oats	10,2	18.5 28.1	
Quinoa	4,5	16.6 24.5	
Rice	5,2	8.1 16.1	
Sweet chestnut	3,4	11.1 22.2	
Sweet potato	2,7	7.1 14.2	
Tapioca	< 2,5	4 8	
Teff	18,3	22 27.7	
Eggs			
Chicken egg white	187,5	11.7 39	
Chicken egg yolk	21,8	10.5 22.8	
Goose eggs	30,6	20.3 29.7	
Quail eggs	34,2	17.7 31.9	
Meat			
Beef	6,2	14.8 29.8	
Chicken	2,6	10.5 20.8	
Deer	< 2,5	8.4 16.8	
Duck	2,8	5.9 11.8	
Goat	5,2	7 14	
Goose	< 2,5	8.9 17.8	
Hare	< 2,5	9.3 18.6	
Lamb	14,4	16 32	
Ostrich	< 2,5	9.2 18.4	
Pork	7,3	10.1 20.2	
Quail	< 2,5	4.5 9	
Rabbit	< 2,5	6.6 13.2	
Turkey	< 2,5	16.8 33.6	
Veal	4,9	14.6 29.2	
Venison	< 2,5	11.5 23	
Wild boar	4,9	11.9 23.8	
Milk products			
Camel's milk	35,1	29.6 40.8	
Goat: milk / cheese	34,8	18.8 35.9	
Halloumi	11,6	8.5 11.7	
Kefir	27,0	20.4 47	
Mare's milk	10,2	12.5 18.2	
Milk (cow)	36,5	14.9 45.8	
Milk (cow, cooked)	29,0	23.6 59	
Rennet cheese (cow)	52,9	17.7 52.9	
Ricotta	33,7	18.3 47.2	
Sheep: milk / cheese	31,6	13.9 33	
Sour-milk prod. (cow)	32,6	23.8 62.4	

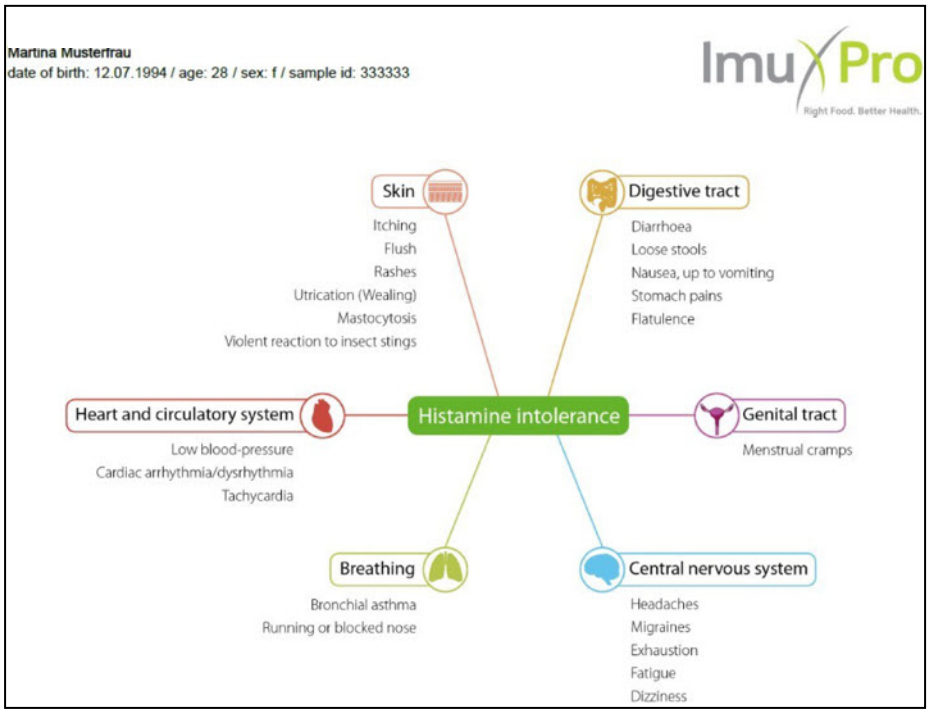
* This type of cereal normally contains gluten. As the measured value for gluten exceeds the limit, the grain is excluded from the list of permitted foods. It may only be consumed in the form of "certified gluten-free" products. For technical reasons, the IgG antibodies against gluten and other species-specific grain antigens must be measured separately.

- Cereals containing gluten
- Cereals without gluten and alternatives
- Eggs
- Meat
- Milk products
- Fruits
- Seeds and nuts
- Salads
- Vegetables
- Spices and herbs
- Fish and seafood
- Teas, coffee and tannin
- Yeast
- Mushrooms
- Specials
- Algae
- Sweeteners
- Food additives

AONM has a further improved IgG food hypersensitivity test of various types that can help to identify delayed reactions to foods (from 4 - 72 hours after consumption). The ImuPro test provides sensitive markers for each food in three categories: green, amber and red (where amber is elevated, and red represents very elevated) for 44, 90, 140 or 270 foods, and 90 or 221 vegetarian foods (See Fig. 1).

Unique is that you can also select from 16 different categories to have food characteristics excluded from your recipes and rotation diet, whether you have an IgG reaction to them or not (such as high in histamine, shellfish and crustaceans, foods containing lactose, etc.). You can order either separately or as an add-on a histamine intolerance test that shows whether low levels of diamine oxidase (the enzyme that breaks down histamine) could be contributing to your/your patient's symptoms. Imupro also offers a test of total histamine degradation capacity. Inadequate histamine degradation is a frequently missed contributor to the conditions mentioned in Fig 2 below.

You can view the replay of Gilian's recent presentation on the ImuPro tests here https://aonm.org/view-past-webinars/, and please see the AONM webpage for further information: https://aonm.org/imupro/. **There is a 10% discount on all IMUPRO tests until end of August!**



4. Upcoming events

AONM

Tuesday 8th August 2023 19:00 BST
Vitamin D: Evolution and Understanding
Dr. David S Grimes
Webinar registration https://aonm.org/VitaminD

Tuesday 22nd August 2023 19:00 BST
Long Covid Pathogen Reactivation: Testing and Therapeutic Options
Dr. Armin Schwarzbach
Webinar registration https://aonm.org/LongCovid

Tuesday 26th September 2023 19:00 BST
RESET EATING: Taking Control of Your Health by Turning Your Food into Powerful Medicine
Dr. Robert Verkerk and Meleni Aldridge
Webinar registration https://aonm.org/ResetEating

Klinghardt Institute
Aug 25th - 30th 2023
Summer Healing Retreat 2023
Emerson College

Sep 9th - 10th 2023
The New Era of Post-Covid Medicine - Core Biological Protocols
Holiday Inn Regent's Park
https://klinghardtinstitute.com/event/the-new-era-of-post-covid-medicine-core-biological-protocols/

Sep 5th - Oct 3rd 2023 **(o**nline)
Klinghardt A.R.T.® 2 Intermediate Online Programme
For further information on all these events, please see: https://klinghardtinstitute.com/events/

BRITISH SOCIETY FOR ECOLOGICAL MEDICINE

BSEM
3rd November 2023
Training Day 16 - Beyond Neuroinflammation II
Hallam Conference Centre
https://www.bsem.org.uk/events/training-day-16-beyond-neuroinflammation-ii

15th - 17th of September 2023
5th International Conference on Chronic Pathologies
Hybrid academic congress
Exchange of the latest ideas and perspectives in the field of chronic diseases
Town Hall Gilching [near Munich], Rathausplatz 1, 82205 Gilching, Germany.
Speakers include Dr. Armin Schwarzbach from ArminLabs and Gilian Crowther from AONM.
https://chronic-pathologies.com/en

THE NUTRITION COLLECTIVE

Nutrition Collective
23rd September 2023
Metabolic Flexibility: Integrative Oncology in Action
Cavendish Conference Centre, London
https://cancerconference.nutritioncollective.co.uk/

8th -10th November 2023
New Developments in Understanding Chronic Illnesses: The Role of Immune Dysfunction and Infections; virtual attendance also possible
Co-organised by Moleculera, our Cunningham Panel laboratory in Oklahoma
https://medstar.cloud-cme.com/course/courseoverview?P=5&EID=20362

For more detailed information about AONM please see our website
www.aonm.org

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