

AONM Newsletter September 2021



15 days to flatten the curve continues on – we are now into over 500, and the Coronavirus Act has just been extended by a further six months. While tragedies are still occurring unrelentingly on multiple fronts, SARS-CoV-2 has come under the microscope as never in history, revealing much about viral mechanisms and approaches to therapy.

In this newsletter AONM takes a look at an angle that has received less attention: the connections between SARS-CoV-2/COVID-19 and the mitochondria. The damage to the mitochondria that the infection and particularly the spike protein appear capable of is devastating. A second article highlights a new study that has investigated the action of various herbs in time-kill assays against Bartonella, as well previous studies by the same team of herbs against Borrelia and Babesia, revealing interesting overlaps between a number of them.

Mitochondria Day held by Biolab Medical Unit promises to be a fascinating, in-depth conference on the powerhouses of our cells that are now so central to research as well as therapy. AONM will be present there on 17th September both with a speaker and an exhibition table.

We look forward to many inspirational events going forward, as well as finally being able to meet in person again. As always, we welcome your feedback: please contact us on info@aonm.org.

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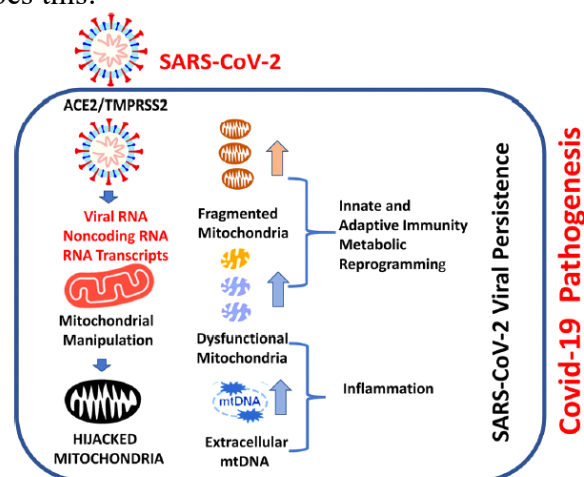
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1. SARS-CoV-2 and the Mitochondria

Huge amounts have been written about SARS-CoV-2/COVID-19 over the last 19 months, but not a lot has surfaced on how this infection and its spike protein affect the mitochondria, the powerhouses of our cells.

A January 2021 study in *Frontiers in Aging Neuroscience*⁽ⁱ⁾ gave a devastating summary of what was already known then about the action of SARS-CoV-2 on the mitochondria: “Emerging evidence suggests that COVID-19 hijacks the mitochondria of immune cells, replicates within mitochondrial structures, and impairs mitochondrial dynamics leading to cell death.”

The *American Journal of Physiology*⁽ⁱⁱ⁾ with the revealing title “Decoding SARS-CoV-2 hijacking of host mitochondria in COVID-19 pathogenesis” describes how CoV-2’s RNA localises to mitochondria, and suggests that it “hijacks the host cell’s mitochondrial function to viral advantage”. Once it enters the host cell, proteins within the nucleocapsid gene such as ORF-9b can directly manipulate mitochondrial function “to evade host cell immunity and facilitate virus replication and COVID-19 disease”. A figure from the study illustrates the mechanisms by which SARS-CoV-2 does this:



Mechanisms involved in SARS-CoV-2 hijacking of host mitochondria

A 2020 study by Codo et al⁽ⁱⁱⁱ⁾ demonstrated that SARS-CoV-2 can infect the vascular endothelium, triggering mitochondrial reactive oxygen species (ROS) production and glycolytic shift.

Singh et al^(iv) also found significant impact on the mitochondria by COVID-19 pathogenesis. Using the Seahorse XF flux analyser, which enables exact analysis of mitochondrial metabolism, their data suggested “that patients with COVID-19 have compromised mitochondrial function and an energy deficit that is compensated by a metabolic switch to glycolysis.” A shift to glycolysis inevitably drives inflammation, indeed it is part of the body’s weaponry in fighting infection, and this was exactly what they found: “This metabolic manipulation by SARS-CoV-2 triggers an enhanced inflammatory response that contributes to the severity of symptoms in COVID-19.”

It is known that ACE2 deficiency shifts energy metabolism towards glucose utilization^(v), and the spike protein of SARS-CoV-2 homes in on the ACE2 receptors, occupying them. It would be a perfect storm if the mitochondria are impacted by ACE2 receptors as well – downregulation of ACE2 receptors would potentially affect the mitochondria to further drive “glycolytic shift”, i.e., switching the cell’s energy production from oxygen to glucose (and thus disabling the mitochondria). And indeed this appears to be the case:

A seminal article that emerged in April 2021 in collaboration with the Salk Institute^(vi) made a direct link with ACE2: they used ACE2-L with decreased stability and ACE2-D with increased stability. Investigations again using the Seahorse XF flux analyser revealed that “endothelial cells (ECs) overexpressing ACE2-L had reduced basal mitochondrial respiration, ATP production and maximal respiration compared to ECs overexpressing ACE2-D”. ACE2-L overexpression also caused glucose-induced glycolysis and drove the cells to “maximal glycolytic capacity”. Their ability to metabolise oxygen sank and they were forced to rely largely on glycolysis.

That study then went on to reveal that the spike protein alone can damage vascular endothelial cells by downregulating ACE2 and consequently inhibiting mitochondrial function. Endothelial cells treated with S1 protein “revealed increased mitochondrial fragmentation”. The histopathology slides show the damage to the mitochondria on encountering the S1 protein: the square on the right shows the mitochondrial structures “blown apart” compared to the control on the left (enlarged in the images on the bottom right and left, respectively).

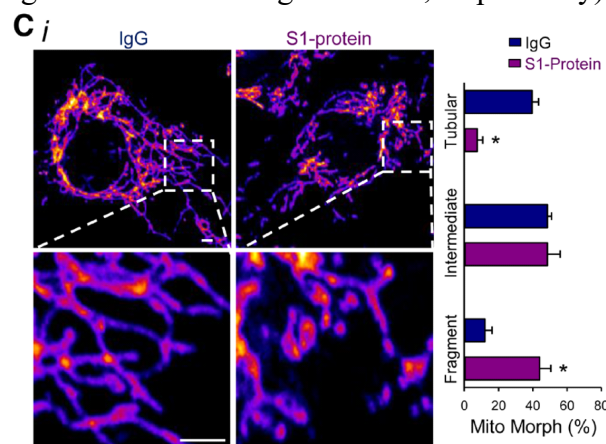


Figure courtesy of “SARS-CoV-2 Spike Protein Impairs Endothelial Function via Downregulation of ACE 2”, *Circulation Research*

This will surely have an impact on the functions of the mitochondria, whether bioenergetics, biosynthesis and/or signalling. Further research is

needed to dig down into this very specific field of science. The mitochondria, being so miniscule, have been hard to analyse in depth in the past, but it is especially significant to note that the Salk study found that the spike protein alone is capable of triggering this damage.

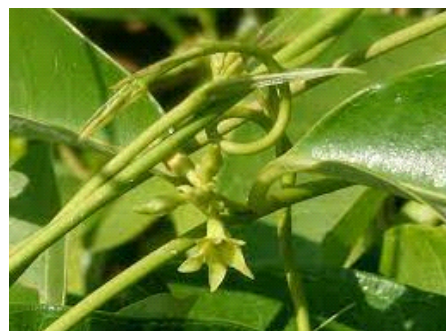
- (i) Ganji R, Reddy PH. Impact of COVID-19 on Mitochondrial-Based Immunity in Aging and Age-Related Diseases. *Front Aging Neurosci.* 2021 Jan 12;12:614650.
- (ii) Singh KK et al. Decoding SARS-CoV-2 hijacking of host mitochondria in COVID-19 pathogenesis. *Am J Physiol Cell Physiol.* 2020 Aug 1;319(2):C258-C267
- (iii) Codo AC, Davanzo GG, Monteiro LB, de Souza GF, Muraro SP, Virgiliada-Silva JV, Prodonoff JS, Carregari VC, de Biagi Junior CAO, Crunfli F, et al. Elevated glucose levels favor SARS-CoV-2 infection and monocyte response through a HIF-1 α /glycolysis-dependent axis. *Cell Metab.* 2020;32:437–446.e5. doi: 10.1016/j.cmet.2020.07.007
- (iv) Ajaz, S., McPhail, M. J., Singh, K. K., Mujib, S., Trovato, F. M., Napoli, S., & Agarwal, K. (2021). Mitochondrial metabolic manipulation by SARS-CoV-2 in peripheral blood mononuclear cells of patients with COVID-19. *American journal of physiology. Cell physiology*, 320(1), C57–C65.
- (v) Bernardi S et al. ACE2 deficiency shifts energy metabolism towards glucose utilization. *Metabolism.* 2015 Mar;64(3):406-15.
- (vi) Lei, Y et al. (2021). SARS-CoV-2 Spike Protein Impairs Endothelial Function via Downregulation of ACE 2. *Circulation research*, 128(9), 1323-1326.

2. New study on herbal remedies for Bartonella

A new study has just been completed that shows high activity of five herbal product extracts (at 1.67 mg/mL or 2.5 mg/mL) against *Bartonella henselae*: *Cryptolepis sanguinolenta*, *Juglans nigra*, *Polygonum cuspidatum*, *Scutellaria baicalensis*, and *Scutellaria barbata*. “Amongst them, *C. sanguinolenta*, *J. nigra*, and *P. cuspidatum* could eradicate all stationary phase *B. henselae* cells within 7 days at 0.83 mg/mL or 1.25 mg/mL in drug exposure time-kill assays These top hits were active against both stationary phase non-growing *B. henselae* and log phase growing *B. henselae* in minimum inhibitory concentration testing. These findings may have implications for improved treatment of persistent *Bartonella* infections.”

This same group has also performed studies on the activity of various herbs against *Borrelia* and *Babesia*. Interestingly, three herbs were particularly effective against all three infections:

Type of herb	<i>Borrelia</i>	<i>Babesia</i>	<i>Bartonella</i>
<i>Cryptolepis sanguinolenta</i>	X	X	X
<i>Juglans nigra</i>	X		X
<i>Polygonum cuspidatum</i>	X	X	X
<i>Uncaria tomentosa</i>	X		
<i>Artemisia annua</i>	X	X	
<i>Cistus criticus</i>	X		
<i>Scutellaria baicalensis</i>	X	X	X
<i>Scutellaria barbata</i>			X
<i>Alchornea cordifolia</i>		X	



Cryptolepis sanguinolenta



Polygonum cuspidatum



Scutellaria baicalensis

Polygonum cuspidatum (Japanese knotweed) is an excellent source of Resveratrol, which has long been prized as a key remedy against *Borrelia* and other coinfections by such luminaries as Dr. Dietrich Klinghardt and Stephen Buhner. Likewise *Cryptolepis*, a thin-stemmed shrub that has a long tradition in African ethnomedicine, and *Scutellaria* (Chinese skullcap). These three, interestingly, all evidenced antimicrobial effects against all three infections in the individual studies.

Links to this group's studies on herbs for *Borrelia*, *Babesia* and *Bartonella* are below:

Lyme: <https://pubmed.ncbi.nlm.nih.gov/32154254/>
Babesia: <https://www.frontiersin.org/articles/10.3389/fcimb.2021.624745/full>

Bartonella: https://journals.lww.com/imd/Abstract/9000/Botanical_Medicines_with_Activity_Against.99934.aspx

Press release for the latest *Bartonella* paper: <https://www.bayarealyme.org/blog/herbal-medicines-demonstrate-potency-against-bartonella-a-disease-causing-pathogen-according-to-new-lab-study/>

3. Mitochondria Day – Clinical insights into these mysterious orchestrators of our cells



Recent years have seen an explosion of scientific research into mitochondrial function. These studies reveal that the mitochondria are involved in all chronic disease, suggesting that there is much that can be done to help. Supporting the mitochondria can be a huge factor in helping patients recover.

On Friday 17th September at the Holiday Inn, Bloomsbury in London, 9.00 am - 5.00 pm, Biolab Medical Unit is presenting a full day on the mitochondria. This is a unique event that will not be repeated, and to the best of our knowledge this teaching is not available to practitioners elsewhere. It will also be livestreamed, so you can choose whether to attend in person or online.

The day is designed to explain how mitochondria work, look at how mitochondrial dysfunction is implicated in virtually every chronic disease and to describe tests that assess mitochondrial function indirectly. The teaching will cover the full range of chronic disease: metabolic, cancer, neurodegenerative, ME, autism, cardiovascular, autoimmune, ageing and many others.

Rachel Nicoll PhD will discuss mitochondrial involvement in chronic conditions and the remedies that have been shown to improve patient outcomes. Dr. Mark Adams will cover mitochondrial testing, while Professor Eija Pirinen from the University of Helsinki will give insights into her research on mitochondrial myopathy and mitochondrial dysfunction in weight loss. Several renowned BSEM doctors/therapists will be explaining how they incorporate mitochondrial remedies into their clinical practice: Dr Sarah Myhill will present her mitochondrial approach to ME and fibromyalgia, Dr. Jenny Goodman will discuss mitochondrial remedies in treating dementia and MS, and Lucille Leader together with AONM's Gilian Crowther will give an overview of mitochondrial approaches in Parkinson's Disease.

Please see

<https://www.eventbrite.co.uk/e/mitochondria-day-tickets-61684068710> for booking information, as well as the schedule and speaker bios.

AONM will also be attending with an exhibition stand – look forward to hopefully seeing you there!

4. UK Medical Freedom Alliance

The UK Medical Freedom Alliance (UKMFA) is run by a team of medical professionals, academics, scientists and lawyers, aided by a growing panel of experts in the fields of science and medicine. The website has links to leaflets, open letters and other resources that many may find very helpful: <https://www.ukmedfreedom.org/>

They also have a Facebook page (<https://www.facebook.com/UK-Medical-Freedom-Alliance-105404128050400/>) and Twitter feed (<https://twitter.com/ukmfal>).

UKMFA has co-founded PROMIC together with the Alliance for Natural Health (ANH). PROMIC – Professionals for Medical Informed Consent and Non-Discrimination – is another grouping of medical professionals and lawyers who have produced templates for exemptions to vaccinations, where required. Their objectives are to facilitate properly informed medical consent and the avoidance of discrimination by government authorities, institutions and private companies based on specific criteria detailed on the website: <https://www.promic.info/>

5. Upcoming events

Biolab Medical Unit



Mitochondria Day

17th September 2021

Holiday Inn Bloomsbury

Coram Street

London WC1N 1HT

This is a hybrid event. You can either attend in person or livestream the event:

<https://www.eventbrite.co.uk/e/mitochondria-day-tickets-61684068710>

Klinghardt Institute



Autonomic Response Testing Level 2 online

20th April 2021 A.R.T.2 Intermediate Online Programme

Autonomic Response Testing Level 1 online

6th July 2021 A.R.T.1 Beginners Online Programme

See www.klinghardtinstitute.com for further details and to register

BSEM



BRITISH SOCIETY FOR
ECOLOGICAL MEDICINE

Training Day 10: Immunology – Spotlight on the Lungs

12 Nov 2021

Hallam Conference Centre

44 Hallam Street

London W1W 6JJ

<https://www.bsem.org.uk/events/57-training-day-10-immunology>

Association of Naturopathic Practitioners



Covid-19 vaccinations: Round 2 Q&A

With Dr. Sherry Tenpenny, Dr Robert Verkerk & Dr. Elizabeth Evans

28th September, 6.30pm (online)

https://theanp.lpages.co/covid-19-vaccines-2/?&utm_source=newsletter&utm_medium=email&utm_campaign=covid_19_vaccinations_round_2_live_q_a&utm_term=2021-08-17

Supporting Mitochondria to increase Longevity & Disease Prevention

Richard Rocker, 11th November – 6.30pm

<https://theanp.co.uk/events/webinars-public/>

BIONEXUS HEALTH



Interview: Mitochondrial Dysfunction and the Cell Danger Response

Dr. Jodie Dashore from Bionexus Health recently conducted an interview with AONM's Gilian Crowther on Mitochondrial Dysfunction and the Cell Danger Response. They covered a wide spectrum of themes, from mechanisms to possible remedies, including photobiomodulation and the Fourth Phase of Water.

Available from noon UK time on Sunday 12th September at this link:

https://www.youtube.com/playlist?list=PL4DzqI_sBqqmBiwb-Ughwu2ZweOFpHW7



Dr. Dashore will be giving an introduction to Bionexus Health on September 24th at 7.00 pm, hosted by Amrita Nutrition: please register at this link:

https://calendly.com/amrita_nutrition/introduction-to-bionexus-health?mc_cid=dd72979891&mc_eid=e9b412a505&month=2021-09

AONM TESTING SERVICES

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

Helping practitioners identify real causes of illness

Testing available for a range of chronic illnesses covering:

Lyme Disease and co-infections

Cancer monitoring: Testing for circulating cancer cells as well as likely apoptosis of cancer cells by natural and other substances to help practitioners determine effectiveness of ongoing treatment

PANS/PANDAS: Assisting practitioners to identify whether an individual's neurological and/or other symptoms could be caused by an autoimmune dysfunction

Food intolerances - various tests available

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