



Mycotoxins: a patient's perspective

Rachel Nicoll PhD



With grateful thanks to all those who helped me with the mycotoxins:

- Dr Abbi Lulsegged
- Gilian Crowther
- Dr Sarah Myhill
- Dr Shideh Pouria
- Dr Richard Pollock





Predisposing factors for other patients

- **Genetics:** 25% of the population are susceptible to mould via the Human Leukocyte Antigen (HLA)-DR gene, which is found on most cells in the body. The HLA protein informs the immune system of potential invaders; when dysfunctional it fails to inform about mycotoxins and hence antibodies are not produced.
- In this case, the mycotoxins are stored in fatty tissue (the brain and adipocytes), where they can cause many chronic conditions, particularly autoimmune disease.
- **Pre-existing multiple chemical sensitivity (MCS):** anecdotal evidence



Predisposing factors for other patients

Pre-existing toxin accumulation

- 1997-8: Very ill from mercury poisoning from cracking a tooth and swallowing the amalgam filling.
- 1999 onwards: Increasingly severe headaches (diagnosed as 'migraine-like headaches'), extreme emotional volatility, depression and relentless weight gain no matter what I ate or did not eat.
- Became completely disillusioned with conventional medicine, sought alternatives.
- Realised through my own research that I had suffered mercury poisoning. Testing showed that I had high levels of virtually every toxic metal – genetic susceptibility? or sensitisation with mercury made me more prone to store others?
- Diagnosed with multiple chemical sensitivity (MCS) at Breakspear Hospital. Headaches now so bad that I had to have daily neutralising vaccines just so that I could eat.
- The neutralising vaccines helped the headaches and the emotional volatility but not the weight gain.



The background: complicating factors

- I still have MCS, but thanks to Dr Charles Forsyth, it is much better and I no longer need the vaccines.
- However, what this means is that if any remedy or drug is needed, it has to be introduced slowly and carefully, so as not to trigger a headache.
- I also cannot take a remedy which contains multiple ingredients. I have to take each of the ingredients in minute doses, separately.
- Up to 2017, I was very slowly reducing the incidence of headaches and was employing fasting to reduce the excess weight.
- However.....2018-2021: Weight gain returned (and fasting no longer worked), fatigue returned, general feeling of unwellness.



Signs and symptoms from Autumn 2020

- Fatigue: Could only work from for about 3-4 hours in the morning. Then I could not concentrate or focus and had to lie down for the rest of the day (but not to sleep).
- Weight gain speeded up – fasting still not working
- Depression
- Itching, particularly on the head and back at night
- Peeing a lot: urgent and frequent
- Brown blotches on the arms (and legs to a lesser extent)

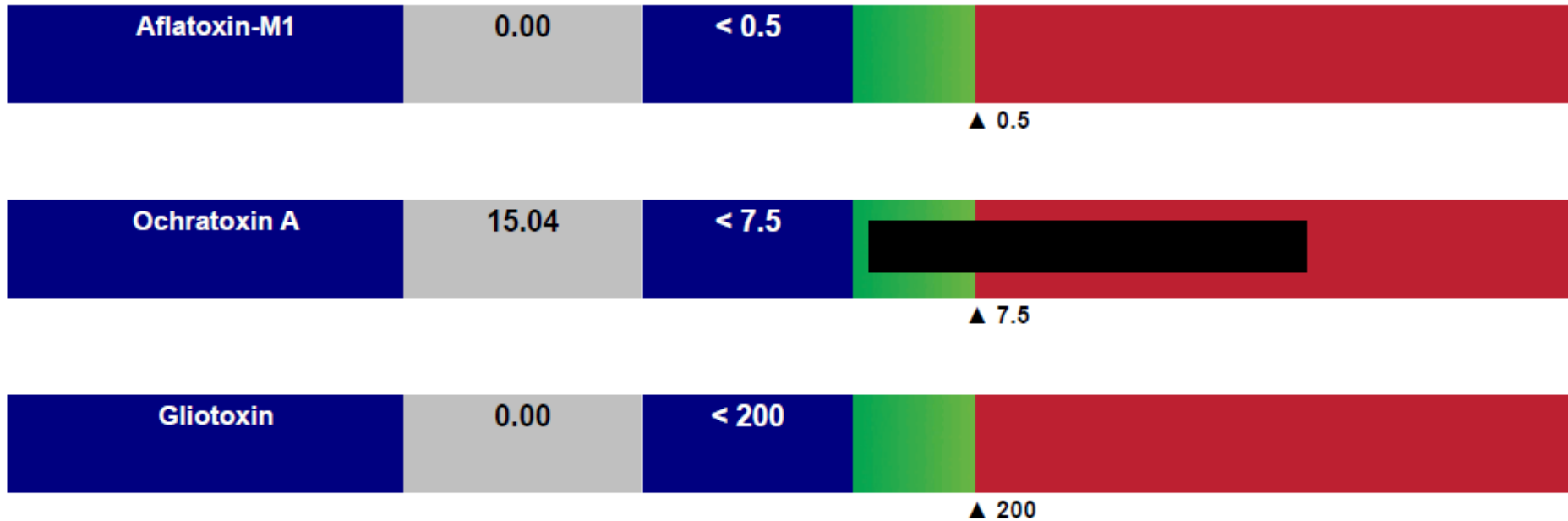


Diagnosis

- Gillian Crowther suggested it could be mast cell activation syndrome (MCAS) or reactive hypoglycaemia, so I contacted Dr Abbi Lulsegg.
- I did various tests which determined that I had high insulin and volatile blood glucose, which bore no relationship to meal timing or content or symptoms. So although I had intermittent hypoglycaemia, it did not seem to be reactive.
- MCAS proved to be a non-starter (tests negative and none of the drugs helped).
- Then the Mycotoxin and Organic Acid tests showed clear evidence of mycotoxins.
- I also had an abnormally low Visual Contrast Test.

Great Plains Laboratory Inc: Mycotoxins March 21

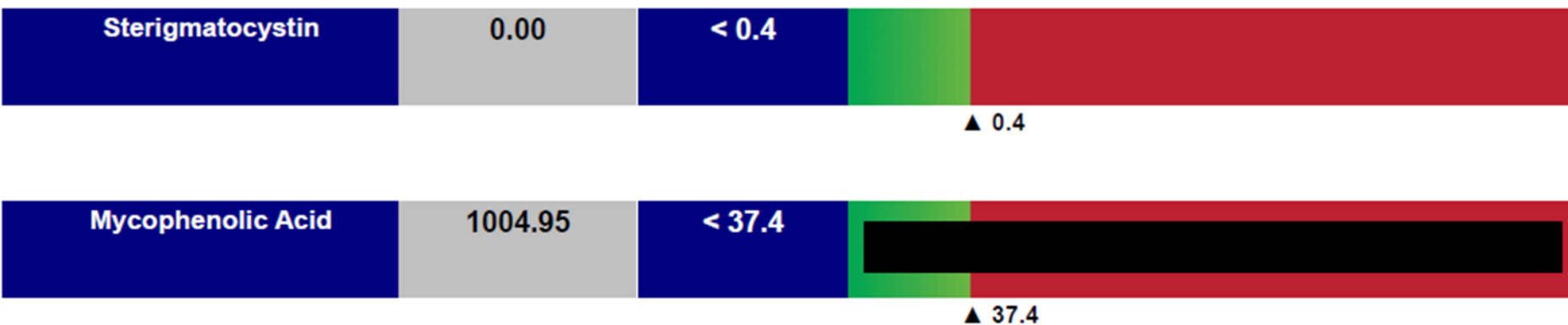
Aspergillus



Ochratoxin A is nephrotoxic, immunotoxic, neurotoxic and carcinogenic

Mycophenolic acid is an immune suppressant and increases the risk of opportunistic infections such as Clostridia and Candida

Penicillium



Both are toxic to the mitochondria

Great Plains Laboratory Inc: Organic Acids

Yeast and Fungal Markers

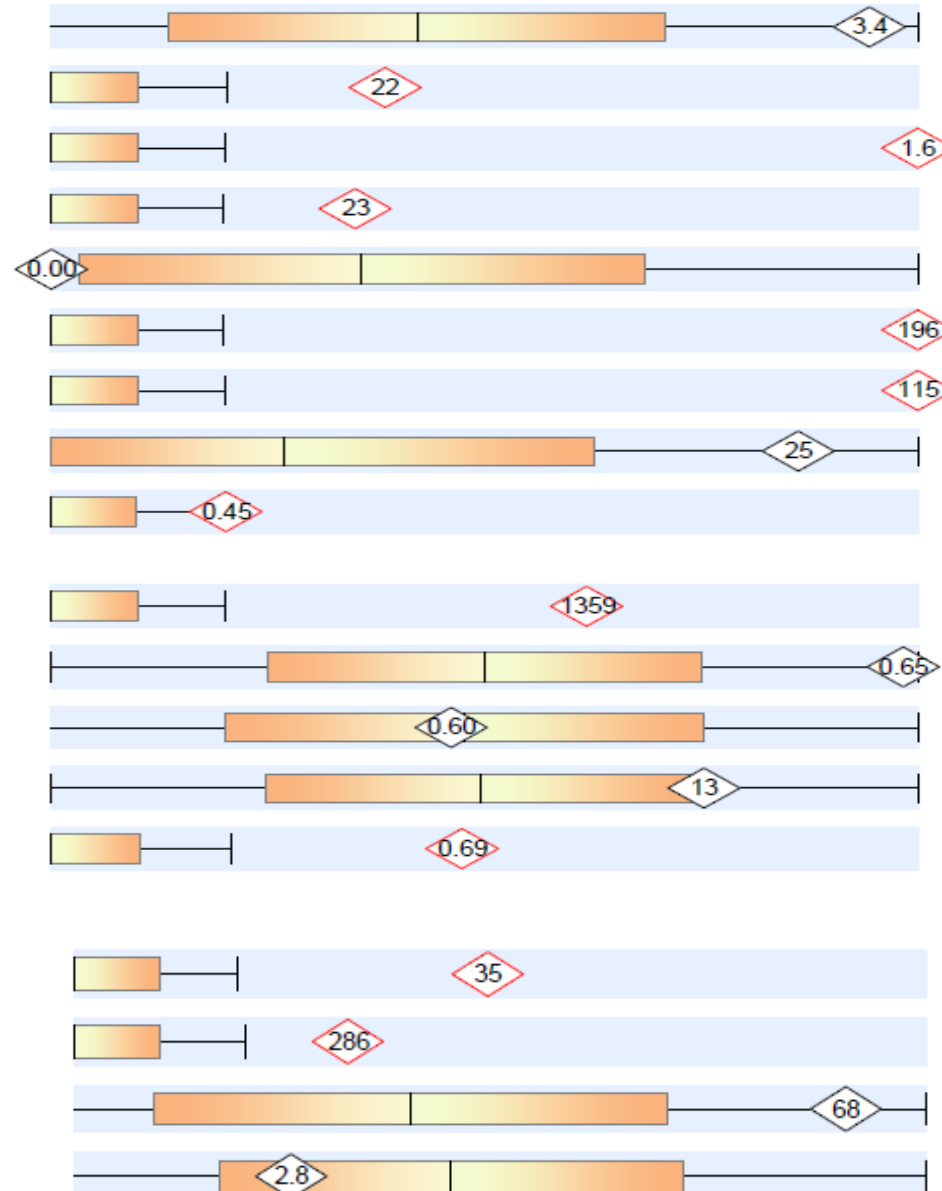
1 Citramalic	≤ 3.6	3.4
2 5-Hydroxymethyl-2-furoic (<i>Aspergillus</i>)	≤ 14	H 22
3 3-Oxoglutaric	≤ 0.33	H 1.6
4 Furan-2,5-dicarboxylic (<i>Aspergillus</i>)	≤ 16	H 23
5 Furancarboxylglycine (<i>Aspergillus</i>)	≤ 1.9	0
6 Tartaric (<i>Aspergillus</i>)	≤ 4.5	H 196
7 Arabinose	≤ 29	H 115
8 Carboxycitric	≤ 29	25
9 Tricarballic (<i>Fusarium</i>)	≤ 0.44	H 0.45

Bacterial Markers

10 Hippuric	≤ 613	H 1,359
11 2-Hydroxyphenylacetic	0.06 - 0.66	0.65
12 4-Hydroxybenzoic	≤ 1.3	0.60
13 4-Hydroxyhippuric	0.79 - 17	13
14 DHPHA (Beneficial Bacteria)	≤ 0.38	H 0.69

Clostridia Bacterial Markers

15 4-Hydroxyphenylacetic (<i>C. difficile</i> , <i>C. stricklandii</i> , <i>C. lituseburensis</i> & others)	≤ 19	H 35
16 HPPHA (<i>C. sporogenes</i> , <i>C. caloritolerans</i> , <i>C. botulinum</i> & others)	≤ 208	H 286
17 4-Cresol (<i>C. difficile</i>)	≤ 75	68
18 3-Indoleacetic (<i>C. difficile</i>)	≤ 11	2.8

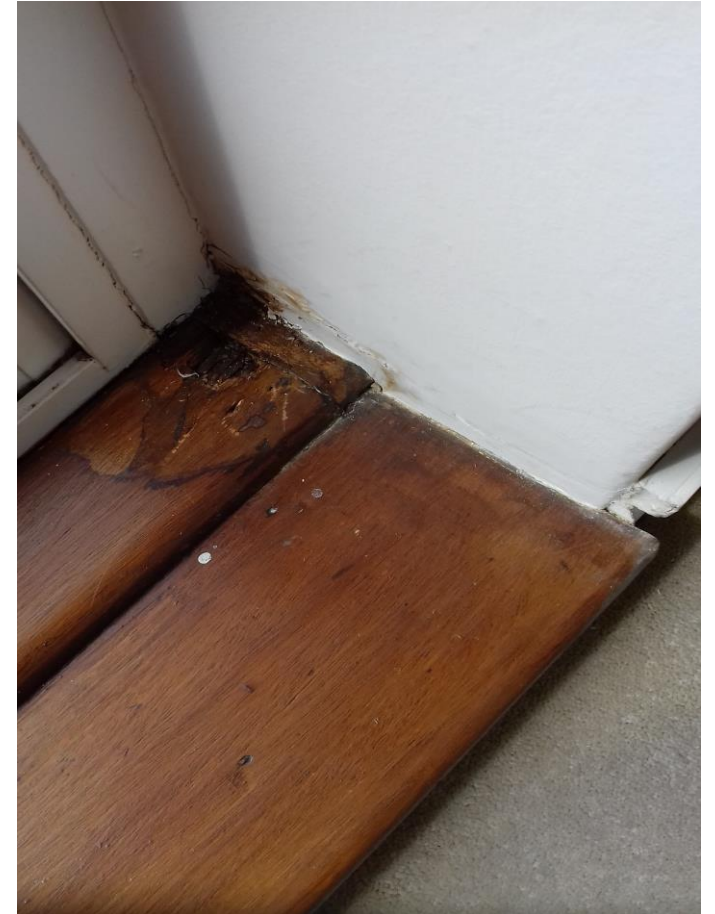


Note how many of the elevated yeast and fungal markers relate to *Aspergillus*. Also 3 of the Clostridia markers indicate Mycophenolic Acid

According to Great Plains, mycotoxin exposure can make any existing yeast infection worse because mycotoxins are immuno-suppressive

Cleaning up my home: leak detection

- No obvious evidence of mould or water damage.
- Abbi Lulsegg recommended <https://www.buildingforensics.co.uk/>, run by Geoff Chandler.
- Summer 2021: After much poking, prodding and scraping, the technician found the source: water ingress at the base of my balcony doors due to a deteriorated seal.
- It would have been impossible to detect this with the naked eye.
- There was no indication of when the leak began but it could easily have begun back in early 2018, when my health started to deteriorate.
- The location of the mould explains the timing of my symptoms: I slept downstairs and worked upstairs, where the balcony doors were located.
- Also autumn and winter 2020/spring 2021 was spent largely in lockdown: heating on, windows closed, indoors most of the day!





Cleaning up my home: removal and remediation

- Building Forensics deliberately do not recommend a company to do removal/remediation.
- I selected what I considered to be the best (<https://www.environmentalservices.co.uk/mould-removal/>) but I ended up not trusting them and I would not recommend them to anyone else.
- However, the job appeared to be done, the area was left to dry out and then the woodwork was rebuilt.
- Did I feel better with this completed? Yes a little, but it was summer, the windows were open and we were out of lockdown, so I was out of my home a lot.
- Then I started to smell something rather suspect in a cupboard under the stairs. I got Building Forensics back to take air samples.
- Yes, another mould source, probably damp encroaching around the rising main.
- I got my builder to put extruded foam around the rising main and painted the whole of the cupboard myself with specialist mould killing chemicals as I didn't trust anyone else to do a proper job! So now I have those chemicals to detoxify as well.

Cleaning up my home furnishings?

- I asked Building Forensics whether I needed to clean all my furnishings as well. They said it was pointless as the location of my flat (overlooking the river) meant that the outside air had more mould in it than most of my flat but the mould was likely to be blown in through the windows and settle on the furnishings.
- Then I had a leak in my garage!
- Was the Universe trying to tell me something?
- By this time I had lost confidence in my home, so I have now sold it.
- And my buyer's surveyor found yet another damp source in an external wall. Definitely I made the right decision to sell!
- I'm now homeless!



Cleaning up what I ingest

- I very much doubt that my food contains mould.
- But several people have suggested that there might be mould in coffee beans/grounds. Apparently this is quite common!
- Coffee is a weakness – my only one!
- So now at home I have Dave Asprey's Bulletproof coffee (organic and guaranteed mould-free)





Possible contribution from masks?

- Several Indian doctors have expressed concern about mask wearing to protect against COVID-19, which gives rise to mucormycosis, a fungal co-infection in COVID-19 patients. An Indian study tested masks to protect against COVID-19 found that fungal contamination was found in 70% of masks (most commonly mucor mould and Aspergillus).
- But the masks were worn for a median duration of 8 days (2-30 days).
- Among those that washed and re-wore their masks, the median duration since washes was 12 hours (4-72 hours). These patients' masks did not accumulate fungal contamination.

(Chandan, S N. "Role of Face Masks in the Rise of Mucormycosis Cases in India during the COVID-19 Pandemic." *Journal of global infectious diseases* vol. 13,3 155-156; Keri VC, et al. Pilot study on burden of fungal contamination in face masks: need for better mask hygiene in the COVID-19 era. *Infez Med.* 2021;29(4):557-561)



Cleaning up my body: a work in progress!

- Mould can make MCS worse: ‘Many of my patients who develop mold toxicity find that....the limbic system becomes far more responsive and reactive to....chemicals in their environment....Quite a few of them can smell the presence of mold at concentrations that the folks around them cannot’. (From Neil Nathan, Energetic Diagnosis)
- Severely hampered by my MCS, I actually managed to take very little of all the excellent drugs and remedies prescribed.
- And the mycotoxin test results show that I was still being exposed – so it’s just as well I was moving!
- To make matters worse, I developed a bad sinus infection in early 2022, which exacerbated the MCS. This meant that I had to take even smaller quantities of the remedies.
- The most common areas of colonisation for *Aspergillus* species are the sinus cavities, lungs and gut (Horner WE, Helbling A, Salvaggio JE, Lehrer SB. Fungal allergens. Clin Microbiol Rev. 1995;8(2):161-179).



Drugs and remedies

Mould killing

Itraconazole (capsules and liquid)

Ascorbic acid

Lugol's iodine

Cistus incanus (Ki Science)

Colloidal silver nasal spray

Amphotericin B nasal spray
(Apoteek De Saedeleer)

Propolis and Boswellia nasal spray (Ki Science)

Biofilm busting

EDTA capsules and nasal spray
(spray from Apoteek De Saedeleer)

Interfase Plus (Klaire Labs)

Biofilm Defence (Kirkman)

Bromelain

Binders

Cholestyramine (Apoteek De Saedeleer)

Chlorella

Activated coconut charcoal

Zeolite

Humic and fulvic acid

Saccharomyces boulardii

Detox support

Glutathione (capsules and i/v) [Glutathione conjugation is the principal pathway for detoxifying mycotoxins]

N-acetyl cysteine (glutathione precursor)

Calcium D glucarate

TUDCA

Spirulina

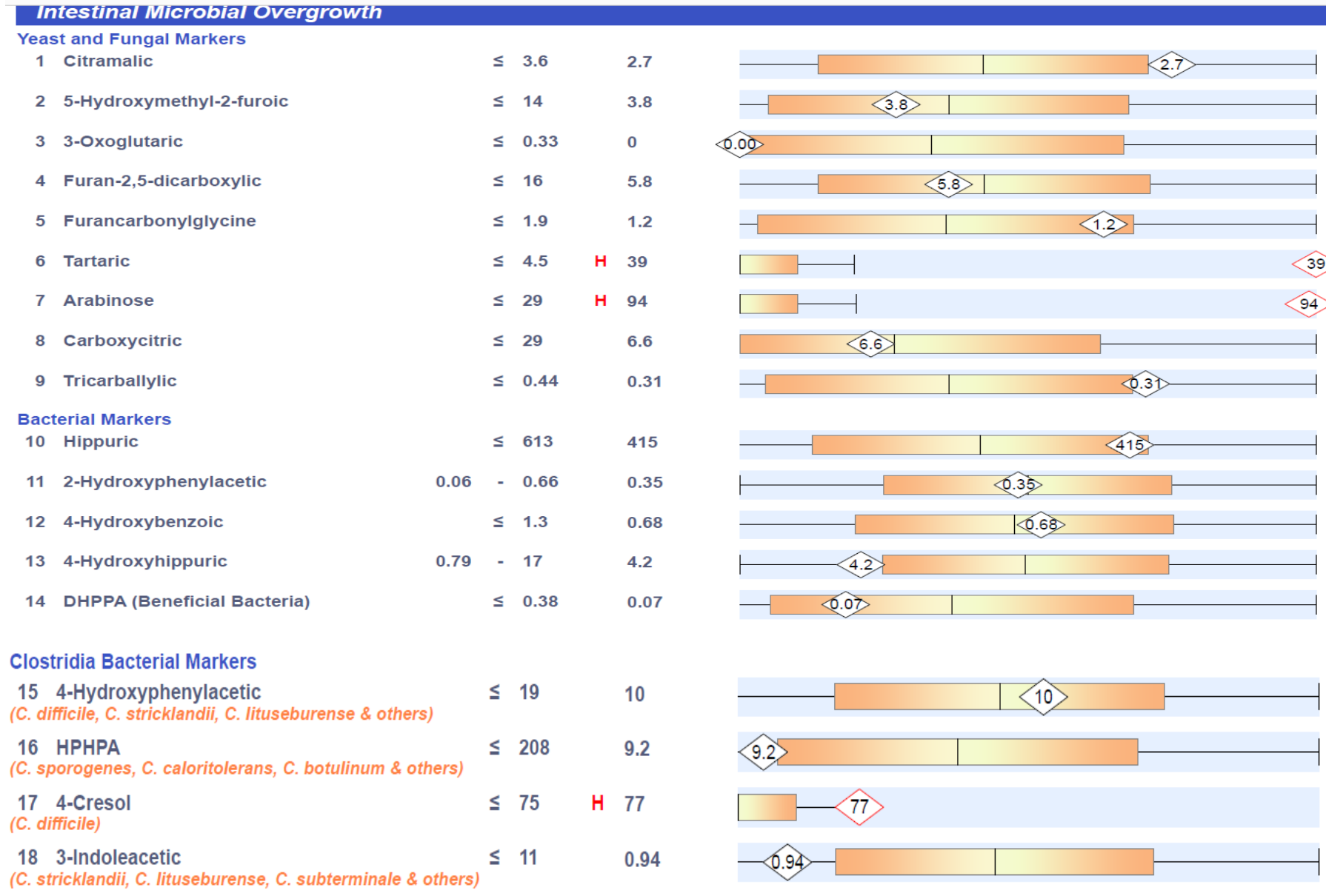
Phosphatidylcholine



Summary of Mycotoxin Test results

MYCOTOXIN SPECIES	Mar 21	Aug 21	Oct 21	Dec 21	Jan 22
OCHRATOXIN A (Aspergillus)	15.04	15.86	<7.5	18.41	
MYCOPHENOLIC ACID (Penicillium)	1004.95	137.50	455.41	155.65	744.88
STERIGMATO- CYSTIN (Penicillium)		9.66			
CITRININ			40.68		60.14

Great Plains Laboratory Inc: Organic Acids Jan 22





Weight 1998-2016

- My weight has proved to be a problem ever since the mercury poisoning and is unconnected with diet.
- Between 1998 and 2016, I put on 5st (70lbs or 31.75kg), roughly ½ my weight again.
- In 2016 I discovered the benefits of fasting.....
- November 2017 for Reversing Obesity and T2D conference:
My weight was 9st 12lbs (138lbs or 62.6kg), i.e. back to my pre-mercury weight.



BRITISH SOCIETY FOR
ECOLOGICAL MEDICINE

Friday 10th November 2017

The Hallam Conference Centre, London W1W 6JJ

Reversing Obesity and Type II Diabetes: Failing with Diet, Succeeding with Fasting

The BSEM presents a Seminar Day comprising:

A morning of 'Inconvenient Truths': the evidence for how and why the dietary guidelines for reversing obesity, type II diabetes and cardiovascular disease fail, and an exposé of the true culprit(s).

An afternoon of Fasting: how and why it works for reversing just about everything!

Dr Jason Fung
Founder, Intensive Dietary Management Clinic

Dr Abbi Lulsegged BSc, MB,BS, FRCP
Kings College Hospital

Dr Shideh Pouria MB BS BSc MRCP (UK) PhD
Grace Medical

Dr John McLaren Howard DSc, FACN
Acumen Lab

Gilian Crowther ND/NT mBANT
Academy of Nutritional Medicine

Dr Helmut Roniger FRCP
Royal London Hospital for Integrated Medicine

Dr Rachel Nicoll PhD
Umea University

For more information please visit the BSEM website:

www.bsem.org.uk

Or contact our admin team on: info@bsem.org.uk or call 07864637723



Weight 2018-2021

- 2018-2021: I put on just under 5 stone, i.e. almost back where I started before beginning fasting in 2016. But....fasting was no longer working! How is this even metabolically possible?
- It is entirely possible that 2018 is when the leak in my sitting room began.
- Interestingly, Dave Asprey (Bulletproof) had the same experience with mould while growing up – he was a very chubby teenager with brain fog. A passionate advocate of fasting, he got rid of his mycotoxins, his excess weight and the brain fog all at the same time.
- Spring 2022: Fasting resumed working again. I have now lost over 2 stone (28lbs, 12.7kg)!
- Remedies: If there is any remedy to be thanked for this is it iodine, which I began taking orally in January 2022 (after the last set of test results). Unfortunately I overdid the iodine, making the MCS worse.
- So is there a biochemical pathway to prove the connection between mould and weight? As it happens.....



Leptin involvement

- Background to leptin: Leptin is a hormone predominantly made by adipose cells and enterocytes in the small intestine. When there is sufficient fat stored in adipose tissue and/or sufficient fatty acids in the blood, leptin is produced to inhibit hunger, thereby diminishing adipocyte fat storage and blood fatty acid levels. When fat storage falls too low, leptin levels are too low and the hypothalamus induces eating by making us hungry, in a negative feedback loop. The amount of leptin in the blood is directly proportional to the amount of adipose tissue.
- Corticosteroids and TNF- α stimulate leptin synthesis, while thyroid hormones appear to decrease it.
- Insulin is a primary regulator of leptin production, with prolonged hyperinsulinaemia leading to an increase in plasma leptin concentration.

<https://my.clevelandclinic.org/health/articles/22446-leptin>

<https://pubmed.ncbi.nlm.nih.gov/10909981/>; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8167040/>

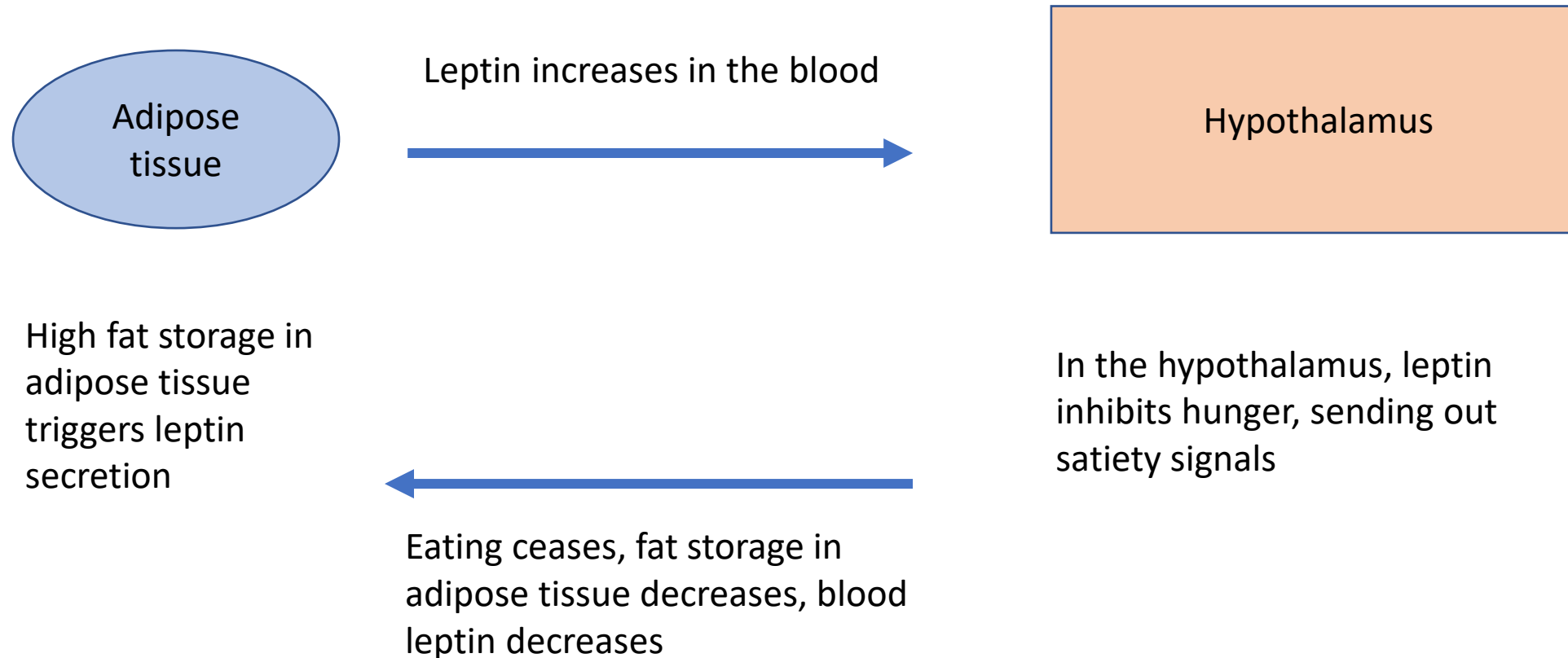
<https://blog.healthmatters.io/2021/07/03/what-is-melanocyte-stimulating-hormone-msh-high-and-low-values-lab-results-explained/>;
Allison MB, et al. 20 years of leptin: connecting leptin signaling to biological function. *J Endocrinol.* 2014 Oct;223(1):T25-35; Considine RV, et al. Serum immunoreactive-leptin concentrations in normal-weight and obese humans. *N Engl J Med.* 1996 Feb 1;334(5):292-5;
<https://pubmed.ncbi.nlm.nih.gov/10909981/>; Park HK et al. Physiology of leptin: energy homeostasis, neuroendocrine function and metabolism. *Metabolism.* 2015 Jan;64(1):24-34)



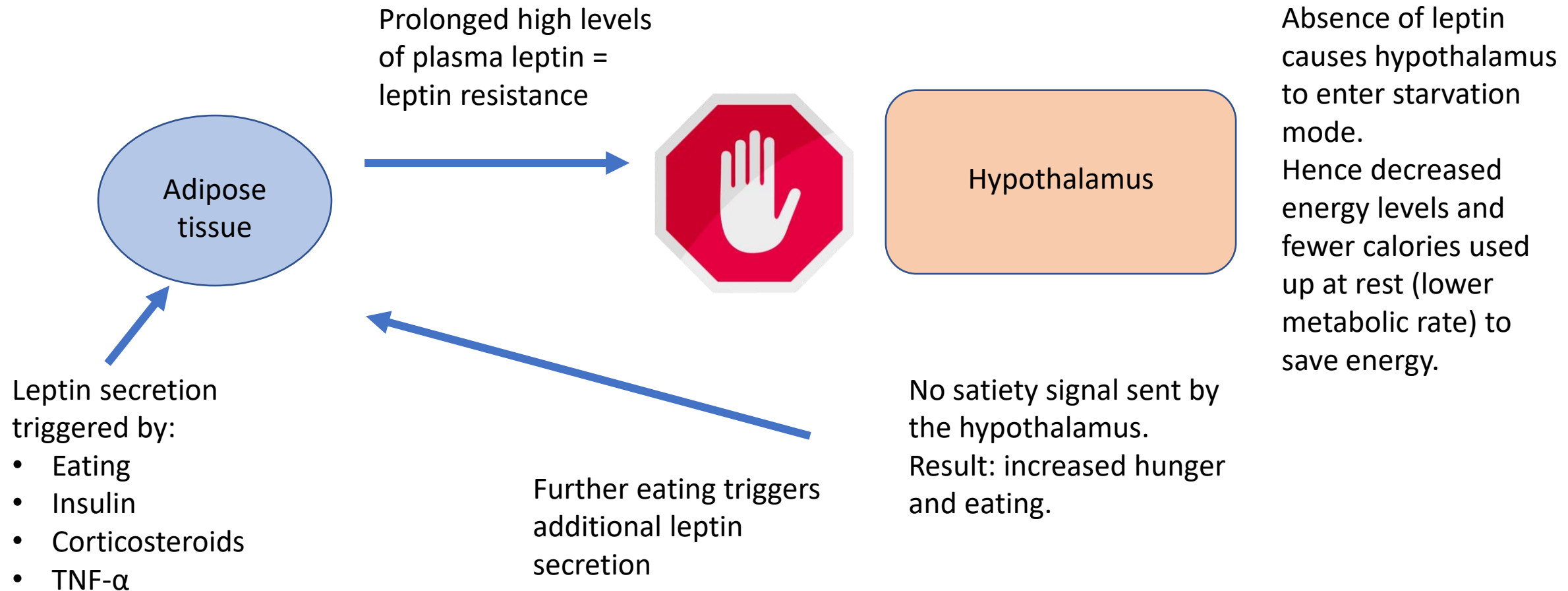
Leptin resistance: it's a complicated issue!

- Leptin resistance: Prolonged high levels of plasma leptin cause leptin resistance, where the leptin fails to bind to its receptor on the hypothalamus, despite there being plenty in the blood. Hence the hypothalamus fails to send out satiety signals. Result: we are hungry and eat more even though the body has enough fat stores. Leptin resistance is now believed to be the leading driver of weight gain in humans.
- So this means obesity = high blood leptin but decreased leptin entering the hypothalamus.
- The lack of hypothalamic leptin in leptin resistance also causes the body to enter starvation mode. It perceives that no food is available, so in an effort to save energy, the brain decreases energy levels and fewer calories are used up at rest (lower metabolic rate).

Leptin working efficiently



Leptin resistance





Melanocyte stimulating hormone (MSH)

- Background: MSH is a hormone produced by the pituitary gland, hypothalamus and skin cells from the same precursor molecule as pro-opiomelanocortin (POMC). Its production is enhanced in response to ultraviolet (UV) radiation as it is important for protecting the skin from UV rays and the development of pigmentation in the skin, hair and eyes. It does this by inducing specialised skin cells called melanocytes to produce melanin; melanin protects cells from DNA damage, which could lead to melanoma.
- Increasing MSH boosts the immune system and stimulates the release of melatonin (pineal gland) and endorphins; rising MSH makes people feel good and can suppress appetite and increase energy expenditure. Conversely, MSH deficiency causes chronic fatigue, inflammation, chronic pain, poor sleep, depression, reduction in the levels of anti-diuretic hormone (ADH), which causes thirst and frequent urination, lack of skin pigmentation with subsequent loss of natural protection from UV rays of the sun and may also result in increased food intake and obesity.

<https://www.yourhormones.info/hormones/melanocyte-stimulating-hormone/>;

<https://blog.healthmatters.io/2021/07/03/what-is-melanocyte-stimulating-hormone-msh-high-and-low-values-lab-results-explained/>; <https://selfhack.com/blog/alpha-msh-its-role-in-weight-control-autoimmunity-cirs-and-cfs/>



Melanocyte stimulating hormone (MSH) properties

- MSH stimulates TRH to induce weight loss and increases T3 in rats (<https://pubmed.ncbi.nlm.nih.gov/10662844/>) (<https://pubmed.ncbi.nlm.nih.gov/25549049/>)
- Independently MSH increases insulin sensitivity and lowers blood glucose, increasing muscle glucose uptake thereby lowering blood glucose. (<https://pubmed.ncbi.nlm.nih.gov/27688995/>).
- Many red-headed people have particular variations in their hormone receptors, causing them to not respond to MSH in the blood.
- MSH is an brain anti-inflammatory hormone and is anti-fungal and anti-microbial. It is also immunosuppressive (<https://pubmed.ncbi.nlm.nih.gov/9620667/>;
<https://pubmed.ncbi.nlm.nih.gov/9045742/>; <https://pubmed.ncbi.nlm.nih.gov/23940690/>;
<https://pubmed.ncbi.nlm.nih.gov/11268350/>;
<https://www.hindawi.com/journals/bmri/2014/874610/>).



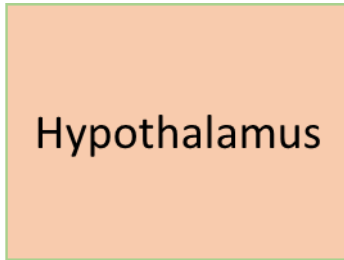
Melanocyte stimulating hormone (MSH) and leptin

- Leptin is the driving force behind MSH production in the hypothalamus but in leptin resistance (where leptin fails to bind to its hypothalamic receptor), no MSH is produced and the body responds with increasing leptin production.
- Leptin secretion in adipocytes, however, can be inhibited by the administration of α -MSH.
- It was Dr Ritchie Shoemaker who first highlighted reduced MSH in biotoxin illness. Patients with mould are invariably low in MSH, so patients feel depressed (no endorphins) and have poor sleep (low melatonin).

(Hoggard N, et al. Regulation of adipose tissue leptin secretion by alpha-melanocyte-stimulating hormone and agouti-related protein: further evidence of an interaction between leptin and the melanocortin signalling system. *J Mol Endocrinol.* 2004 Feb;32(1):145-53; Norman D, et al. ACTH and alpha-MSH inhibit leptin expression and secretion in 3T3-L1 adipocytes: model for a central-peripheral melanocortin-leptin pathway. *Mol Cell Endocrinol.* 2003 Feb 28;200(1-2):99-109)

Melanocyte stimulating hormone (MSH) and leptin

Leptin enters the hypothalamus



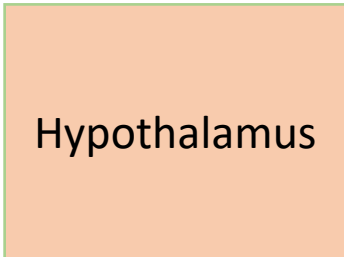
Increased MSH



Increases:

- Insulin sensitivity
- Immunity
- Melatonin release
- Endorphins

Leptin does not enter hypothalamus in leptin resistance



Decreased MSH



Induces:

- Chronic fatigue
- Chronic pain
- Inflammation
- Poor sleep
- Depression
- Reduction in levels of anti-diuretic hormone (ADH), which causes thirst and frequent urination
- Increased food intake
- Weight gain

- Redheads can have particular variations in their MSH receptors, causing them to not respond to MSH in the blood.



How to raise MSH naturally

- Sunlight exposure: UVA increases MSH and UVB increases MSH receptors.
- Nicotine (through activation of MC4 receptors)
- Cold (Wim Hof effect?)

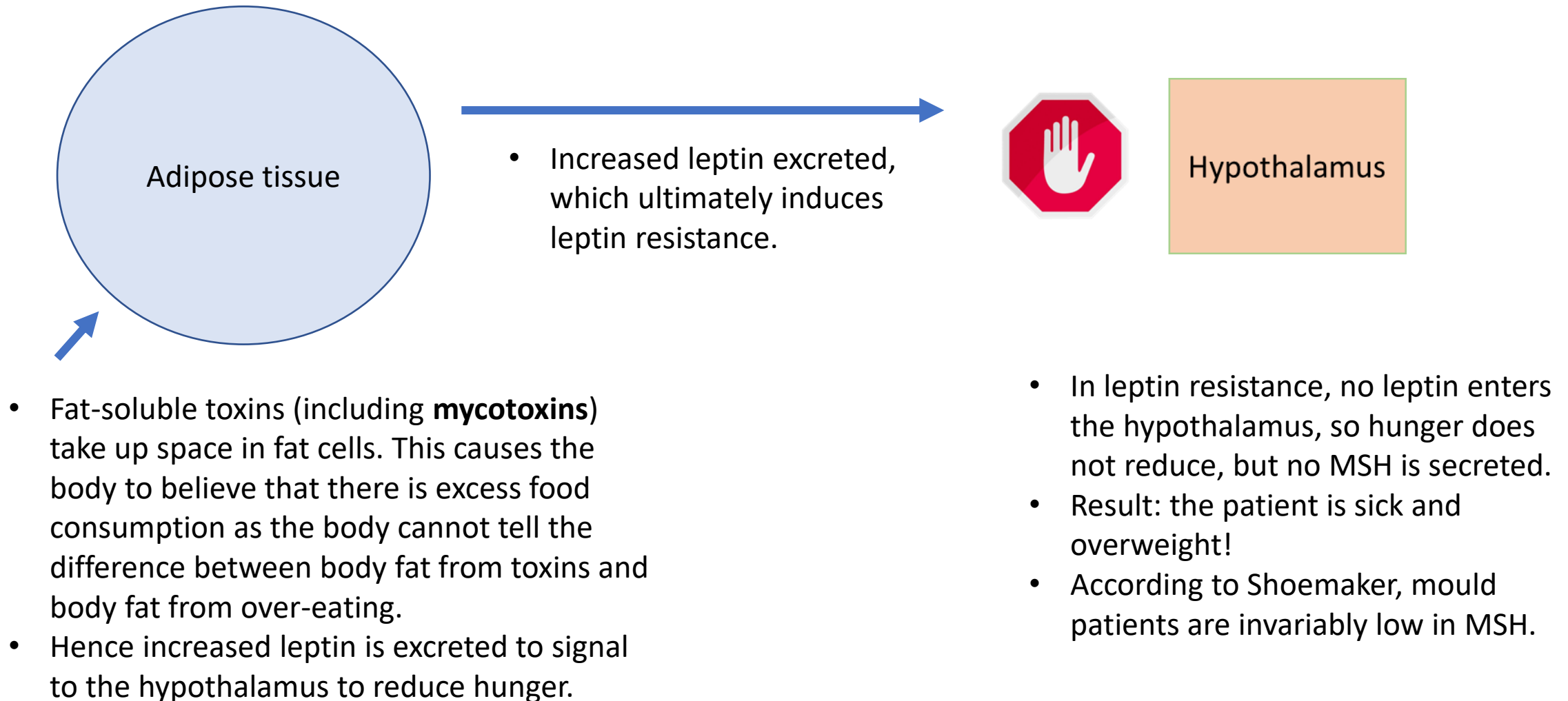


Mould, weight, leptin and MHS: anecdotal evidence

- Academic papers report weight loss with mould, but this is not the experience of numerous patients, who are quite vocal on line about the weight gain!
- Some patients seem to feel relentlessly hungry, while others have little appetite.
- A number of sources think that the weight gain comes from indulging an increased hunger as a result of absence of leptin in the hypothalamus, but for those who lose their appetite, there must be another mechanism at work.
- See next slide: We are familiar with fat-soluble toxins being stored in adipose tissue and it also seems to be the case with mycotoxins. Increased fat storage leads to increased leptin levels to inhibit hunger, as the body cannot tell the difference between body fat from toxins and body fat from over-eating. Permanently high leptin levels leads to leptin resistance in the hypothalamus, this leads to no MSH being produced.

<https://www.meshwithmold.com/post/mold-weight-gain-and-weight-loss>; <https://karlenv.com/can-mold-cause-weight-gain/>;
<https://gatewaynaturalmedicine.com/how-mold-and-gut-health-can-affect-your-weight/>; <https://hypothyroidmom.com/is-mold-making-you-fat-depressed-forgetful-and-tired/> <https://selfhack.com/blog/the-root-causes-of-mold-problems-msh-sirt1-socs3-and-hypoxia/>

Mycotoxin impact on leptin





Resources

- Biolab Medical Unit: <https://www.biolab.co.uk/> A range of nutritional and environmental toxin tests. Is the agent for:
- Great Plains Laboratory: <https://www.greatplainslaboratory.com/#>: Webinars, Articles, Blogs
- Dr Ritchie Shoemaker: <https://www.survivingmold.com/>: useful information on drug-based recovery, as well as free Visual Contrast Test.
- Neil Nathan book available on Amazon: 'Toxic: Heal Your Body from Mold Toxicity, Lyme Disease, Multiple Chemical Sensitivities, and Chronic Environmental Illness'.

Thank you!