Methylation and Mitochondrial Health

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METHYLATION AND MITOCHONDRIAL HEALTH

What is MTHFR?
How MTHFR changes Methylation?
How important is methylation in mitochondrial health?

Key mitochondrial nutrients: carnitine, ATP, creatine

What is the mitochondrial/viral connection?

Case Studies

Mitochondrial Function

An organelle found in large numbers in most cells, in which the biochemical processes of respiration and energy production occur. It has a double membrane, the inner layer being folded inward to form layers (cristae).

Mitochondria functions:
• Make energy, such as ATP
• Maintain a better cell environment
• Work as an independent organelle with their own DNA
What Is MTHFR?

MTHFR stands for: METHYLENE-TETRAHYDROFOLATE REDUCTASE

- It is an enzyme that converts folate into the active form (5-Methyltetrahydrofolate)
- The folate (DHF, dihydrofolate) has to be converted via many steps to the active folate 5-MTHF
- The MTHFR enzyme affects this at the last step. So if there is a mutation in the gene, it is going to be affected by how much active folate is available.

What is Methylation?

- It is the transfer of a methyl group (one carbon atom and 3 hydrogen atoms) onto amino acids, proteins, enzymes and DNA in every cell and tissue.
- Methyl groups are the “On-Off switches” of the cells activities
- All genuine healing is within the cell. When the cell and its membrane are healthy, the other tissues and organs will function properly.

Methylation & its consequences
Methylation & Mitochondrial Health – integrally related

1. Phospholipid Production
2. Carnitine
3. Creatine
4. ATP Production
5. Viruses and other Infections
6. Myelination, Methylation and Mitochondria

Things That Affect Methylation

- Environmental toxins e.g., pollution & bisphenol A
- Chemicals & heavy metals e.g., lead, mercury, smoking
- Stress – both mental and physical (including exercise)
- Aging
- Medications e.g., antacids, methotrexate
- Diet
- Alcohol
- Infections – Viruses/Bacteria/Fungal

PHOSPHOLIPID PRODUCTION & MITOCHONDRIA
What are phospholipids?

Phospholipids are made up of two fatty acids, which are attached to a glycerol head. The glycerol molecule is also attached to a phosphate group, and this is the hydrophilic part of the molecule. The tail ends of the fatty acids consist of the hydrophobic part of the molecule.

Phospholipid functions

- Form cell membranes as phospholipid bilayer
- Allow the cell membrane to take different shapes and expand and shrink
- Allow plasma membranes to be selectively permeable to solutes such as proteins, ions and water
- Used as 2nd messenger to transduce signals between cells

Phospholipid production & methylation

Phospholipid production

- Phospholipids are synthesized in the endoplasmic reticulum (ER) and Golgi, and membrane phospholipids are synthesized in ER
- Phosphatidylcholine and phosphatidylethanolamine are the two main phospholipids in eukaryotic cells

Phospholipid methylation

- Phosphatidylethanolamine is methylated to form phosphatidylcholine catalyzed by PEMT in mitochondria of the liver
- PEMT is required for maintaining cell membrane integrity and choline formation
- Phosphatidylethanolamine methyltransferase = PEMT

Phospholipid methylation & mitochondria

- Phospholipid methylation controls mitochondrial degradation, contributing to mitochondrial quality and quantity control
- Phospholipid methylation is linked to phospholipid formation
- PEMT is required for phospholipid methylation
- PEMT deficiency causes obesity and insulin resistance
- PEMT Val-to-Met substitution causes increased risk of non-alcoholic liver disease
2. Carnitine & Mitochondria

Carnitine and methylation

Betaine is considered to be a lipotropic compound that can influence lipid metabolism in animals. It improves energy metabolism probably by supporting the synthesis of carnitine, which is necessary for the transport of long-chain fatty acids to the mitochondria where they are oxidized.

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3798916

What is carnitine?

Carnitine is biosynthesized from the amino acids lysine and methionine. The compound plays a crucial role in energy production, as it is responsible for transporting fatty acids to the mitochondria.

Carnitine functions

- Transports long-chain fatty acids to the mitochondria to be burned to produce energy
- Transports waste and toxic compounds out of the mitochondria to prevent toxin build up
- Carnitine is high in skeletal and heart muscles where fatty acids are used as dietary fuel mostly

MTHFR & carnitine insufficiency

- Methylation by SAM is a critical step in the synthesis of many proteins
- MTHFR genetic SNP’s may mean a reduction in methyl’s and SAM, and thus reduce the synthesis of carnitine
- People with MTHFR are at greater risk of having insufficient carnitine or carnitine deficiency
Mitochondria & chronic fatigue

- Mitochondrial dysfunction happens in almost every chronic disease
- Mitochondrial dysfunction related chronic fatigue features:
  - Loss of electrical/chemical transmembrane potential
  - Dysfunction of electron transport chain
  - Reduction in transporting critical metabolites into the mitochondria
  - Reduction of oxidative phosphorylation & ATP production

Carnitine to treat mitochondria & chronic fatigue

- Normally the body has sufficient carnitine from the liver & kidneys
- Chronic diseases with mitochondrial dysfunction often have chronic fatigue especially those with MTHFR and methylation issues
- Combined carnitine, α-lipoic acid, and coenzyme Q10 and NADH can be used to reduce chronic fatigue and other symptoms associated with chronic disease; and can naturally restore mitochondrial functions, even in long-term patients with intractable fatigue

3. Creatine & Mitochondria

Creatine

- Methyl guanidine-acetic acid. It is a nitrogenous organic acid produced in the liver, and helps supply energy to all cells, particularly muscle cells through ATP production. The compound is formed of three amino acids: arginine, glycine and methionine, (all key components of the methylation cycle)

Creatine functions

- Stored in skeletal muscles, & helps build muscles
- Causes water retention
- Boost memory
- Supplies energy through ATP production
MTHFR & creatine insufficiency

- Methylation by SAM is a critical step in the synthesis of many materials
- MTHFR SNP’s may reduce methylation and therefore SAM, and thus reduce the synthesis of creatine through converting guanidinoacetate to creatine (VIA GAMT – guanidinoacetate N-methyltransferase)
- People with MTHFR have higher chance of having insufficient creatine or creatine deficiency

Creatine and chronic fatigue

- Improves muscle endurance and reduces fatigue in muscles
- Low dose creatine can enhance resistance to fatigue during high intensity of muscle contraction
- In chronic fatigue patients, it can affect positively creatine metabolism and work capacity

What is ATP production?

ATP is generated from ADP and phosphate ions by a complex set of processes occurring in the mitochondria. These processes depend on the activities of a special group of enzymes.

It relies on these enzymes to supply energy:

- NAD: nicotinamide adenine dinucleotide
- NADP: nicotinamide adenine dinucleotide phosphate
- FAD: flavin adenine dinucleotide

4. ATP Production in Mitochondria
Citric acid cycle (Krebs cycle)

- Pyruvate (from glycolysis, 2 molecules per glucose)
- NADH
- CO₂
- CoA
- FADH₂
- FAD
- ATP
- NAD⁺
- H⁺
- ADP

MTHFR & ATP production insufficiency

- Methylation by SAM is a critical step in the synthesis of many materials as creatine, CoQ10, and others
- Reduced methylation reduces the synthesis of materials related to ATP production
- People with MTHFR mutations have a higher chance of having lowered ATP production
- This may cause mitochondria related chronic fatigue
Caution: Known soy allergy

Suggested Use
Take one capsule 30 minutes before breakfast and five capsules before lunch or dinner (ten capsules per day) for the first two months, and five capsules before breakfast in month 3 and beyond. It is important to keep with the protocol for the first two months so that enough cell membranes are repaired --- which will allow the patient to feel the difference. This equates to 2 bottles per month for each of the first two months, and 1 bottle per month thereafter.

Cautions: Known soy allergy
5. Viruses & other Infections and Mitochondria

Why MTHFR is related to infections?

MTHFR causes reduction of methylation in multiple molecules - DNA, RNA, and protein synthesis; and this may result in lower immune function as well as higher chances of infections.

Infections:
- Viruses
- Bacteria
- Fungi
- Parasites

MTHFR and other infections

- Decreased T and B lymphocyte numbers and functions may reduce immune functions against bacterial infection such as tuberculosis
- LPS is produced from bacterial infections such as E. coli bacteria
- Both virus and LPS can induce IDO expression in the body
- IDO can induce an increase in kynurenine pathway, and a decrease in tryptophan and reduced mitochondria health, particularly in the CNS

Methylation and disease risks

Proper Functioning of the Methylation Cycle Helps Reduce Risk of:
- Heart Disease
- Alzheimer’s Disease
- Cancer
- Diabetes
- Migraines
- High levels of homocysteine
- Dementia
- Decreased Energy
- Diminished Muscle Tone
- Increased Inflammation
- Decreased immunity
- Sleep
- Infertility
- Numbness
- Depression
- Anxiety
- High levels of lathyrosine
Viruses, Cancer,

- Instruct the immune system to turn on
- Increase NK cell activity
- Transfer Factors are manufactured within Helper T cells. Transfer factors influence the immune system by:
  - It’s a signal that a TH1 response is underway
  - This results in new Helper T cells, NKS’s & macrophages
  - Decreases TH2 related cytokines and strengthens TH1 response
6. Myelin Methylation & Mitochondria

Myelin

It is a fatty material, a mixture of proteins and phospholipids that coats, protects, and insulates nerves, enabling them to quickly conduct impulses between the brain and different parts of the body.

**Myelin sheath functions are**

- Axons are bundled to form nerves
- Lipid-rich myelin sheath acts as an insulator to allow high transverse resistance and limit a current to flow along the nerve segments between the nodes of Ranvier
- An impulse speed: 70-120 meter/second, same as a race car

MTHFR and Myelin

MTHFR and its reduced methylation has an impact on myelination. You need methyl groups to produce phosphatidylcholine.

- High homocysteine in the blood inhibits myelination of nerves
  - Increased de-myelination reduces myelin function in nerves
Methylation & Nerve System Protection

- Methylation is required for nerve myelinating & pruning
- Myelin is a sheath wrapping the nerves to insulate and facilitate proper nerve functions
- Pruning prevents excessive wiring of unused neural connections and reduces the synaptic density
- Insufficient methylation causes decreased myelination or no re-myelination after nerve damages from virus infection or heavy metal toxicity

Case History 1

38 year old female

Key issues:
1. Fatigue – for as long as she could remember. Energy 1-2/10
2. Food Intolerance – some immediate some delayed
3. Brain Fog/Concentration & Clarity
4. Inability to handle stress
5. Currently experiencing severe agitation, palpitation and tremors
6. Health was a roller coaster

Case History

- Fatigue had been going on for years.
- Started on methylguard plus on advise of another practitioner.
  - Felt great for a week or two but then had almost like seizures, mouth and jaw seizing up, tremors and tingling all over her body, couldn’t speak, words stunted, simple cognitive functions were difficult. It’s like my mouth can’t keep up with my brain. Jaw feels wired
  - Feels wired but tired
- Currently on Lovan
- PMT – moodiness, crushing sleepiness for up to a week before, cycle regular (every 28 days), bleed 5-6 days. Had only one period since been on the methylguard, instabilty
- Blood sugar issues
- Has had fibroids I in the past
- Anxiety was 10/10 when I saw her.
Case History

• Pre-methylguard – her biggest issue was her inability to handle stress, fatigue and brain fog.
• Mum and grandmother both have RA
• Dad – has anxiety/hypertension and prostate cancer
• Grandfathers both had cancer
• Brother has asthma, respiratory issues
• Her sleep was good
• Gut very much affected by the foods she was eating
• Food issues – palpitations, cough, gravelly throat, sinus, PND, flushing, sweating – definitely worse with dried fruit, wine
• Urination - urgency

Case History

• Bloods
  o Zinc 11.0 umol
  o Secretory IGA very high 678
  o Homocysteine 6 umol/L
  o Folate 42.7 nmol/L
  o B12 598 pmol/L
  o Biochemistry good
  o MCV 87fl
  o RDW 12.7
  o WCC good
  o RCC good

Oestrogen Metabolism

Methylation
Key Genes

- MTHFR A1298C homozygous
- MTR ++
- MTRR ++
- MTHFD1 ++
- NOS 3 +/-
- MnSOD ++
- CYP1B1 ++
- COMT ++
- GPX1 ++
- GSTT ++
- FUT2 +/-

Appointment 1

- Sulphur – gave molybdenum
- Low histamine Diet
- Referred for pyrroles/estrogen metabolism
- Removed methylguard, gave a B without B12/folate
- ATP fuel - Phospholipid support
- Electrolytes to help use methyl’s
- Niacin for next 24 hours to reduce methyl’s

Appointment 2

- Energy now 5-6/10
- Niacin had helped with tremors, hardly any now.
- Much Calmer
- Feeling of seizures had gone
- Tingling gone
- Hasn’t had to take her Lovan at all
- Mood has improved significantly

- She hadn’t done blood test, estrogen metabolism test or pyrrole test yet.
- Added:
  - 50mg of zinc at night
  - 5AMe x 100mg once a day
  - P5P – 33.8mg
  - B12 Support re-introduced

Appointment 3

- Energy now 8/10 every day
- Anxiety 2/10
- No food reactions at all
- Breathlessness gone
- PMS symptoms getting better
- Gut has been better on the niacin and all the supplements, much calmer, no cramping, diarrhoea has settled alot

- Ferritin 11
- Oestrogen metabolites come back – not great.
- Now that bowels have settled, added in magnesium
- Supported estrogen metabolism
Appointment 4

Rang to say she’s feeling so good she doesn’t need an Appointment until May.

Next Steps:
• liver/glutathione support
• Improve sulphur sensitivity
• Re-look at GUT

Case History 2

33 year old female

Key issues
1. Previous miscarriage ~12 weeks, but was only 6-7 week size. Wants to try again soon.
2. Energy very bad 2/10. Needs to lie down after lunch every day
3. Gut – bad since she was a teenager. Very noisy, moves around a lot, worse with yeast, grains, seeds. Lots of wind. Gets shaky if she doesn’t eat.
4. Brain terrible – can’t concentrate, memory not good
5. History
   1. EBV virus at 16 years of age
   2. Mum, Dad and siblings all have IBS
   3. Both Grandmothers had breast cancer
   4. Dementia in the family

Case History

• Sleep good
• Diet – is currently gluten free but not religiously
• Headaches – gets tension headaches/migraines twice a year
• Constant light sensitivity
• Allergies to dust mite – dump, mould
• Has had recurrent UTI’s
• Cycle – regular 28-29 day cycle, 5 days bleed, PMS – very moody, mood down, sore breasts, a lot of pain, recently had thrush, low libido, lumpy, cystic breasts
• Palpitations occasionally, low blood pressure (103/71) – gets dizzy if she gets up too quickly, sensitive to cold.
• Pins and needles in hands, even if she holds them out to her side
• Anxiety a lot
• Mood ok but very low coming in to her period

Bloods
• Ferritin 27 ug/L
• WCC 4.9 – from 1.6 in the start
• Cholesterol 3.9 – was 3.3 mmol/L
• Triglycerides .5mmol/L was 0.4
Appointment 1

- Need to assess:
  - Clotting factors
  - Oestrone Metabolism
  - Folate levels
  - Referral for bloods
  - My Prescription
    - Kolorex – 3 in the morning
    - Pre script assist at night
    - ATP fuel – High dose
    - Prenatal and antioxidant
    - Digestive enzymes and HCL with each meal
    - Methyl B12 drops
    - Gluten and dairy free diet

Key Genes

- MTHFR C677T homozygous
- BHMT08 ++
- CBS 699T ++
- FOLR2 ++
- PEMT ++
- SHMT2 ++
- NDUF ++
- NOS ++
- COMT +/-
- VDR +/-
### Homocysteine

| Homocysteine | 12.2 ug/dl (5.0-12.0) |

### Cardiolipin / Beta2Glycoprotein IgG Abs

<table>
<thead>
<tr>
<th>Cardiolipin IgG Abs</th>
<th>42.8 U/mL (&lt; 20)</th>
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<tbody>
<tr>
<td>Beta2Glycoprotein1 IgG Abs</td>
<td>71.5 U/mL (&lt; 20)</td>
</tr>
<tr>
<td>Cardiolipin IgM Abs</td>
<td>1.3 U/mL (&lt; 20)</td>
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</table>

#### Comment

<table>
<thead>
<tr>
<th>Interpretation</th>
<th>(U/mL)</th>
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<tbody>
<tr>
<td>Negative</td>
<td>0-19</td>
</tr>
<tr>
<td>Low Positive</td>
<td>20-39</td>
</tr>
<tr>
<td>Moderate Positive</td>
<td>40-79</td>
</tr>
<tr>
<td>High Positive</td>
<td>&gt;80</td>
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### Results of bloods:

- Antiphospholipid antibodies (specialist didn’t want to do anything about this due to normal platelets and no history of clots) but I did:
  - Increased B12
  - Multi mineral
  - B6
  - Herbal immune formula
  - Continue ATP fuel
  - NADH support

- Thorne methylguard - Methylcobalamin B6, 5-MTHF, Trimethylglycine
- Indole 3/ DIM/ sulphuraphane
- Increased B12
- Multi mineral
- B6
- Herbal immune formula
- Continue ATP fuel
- NADH support

### Hemoglobin

<table>
<thead>
<tr>
<th>Hemoglobin</th>
<th>140 g/L (110-160)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red cell count</td>
<td>4.6 g/dL (4.5-5.5)</td>
</tr>
<tr>
<td>Hematocrit</td>
<td>0.44 L/L (0.38-0.48)</td>
</tr>
<tr>
<td>MCH</td>
<td>28 pg (27-31 pg)</td>
</tr>
<tr>
<td>MCHC</td>
<td>32.1 g/dL (32.0-33.0)</td>
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<tr>
<td>RBC</td>
<td>4.0 x 10^12/L (4.0-5.4 x 10^12/L)</td>
</tr>
<tr>
<td>WBC</td>
<td>12.5 x 10^9/L (4.0-11.0)</td>
</tr>
<tr>
<td>Neutrophils</td>
<td>1.87 x 10^11/L (2.0-7.0)</td>
</tr>
<tr>
<td>Lymphocytes</td>
<td>1.36 x 10^11/L (1.5-4.5)</td>
</tr>
<tr>
<td>Monocytes</td>
<td>0.20 x 10^11/L (0.0-0.5)</td>
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<tr>
<td>Eosinophils</td>
<td>0.00 x 10^11/L (0.0-0.5)</td>
</tr>
<tr>
<td>Basophils</td>
<td>0.00 x 10^11/L (0.0-0.5)</td>
</tr>
<tr>
<td>Platelets</td>
<td>263 x 10^9/L (150-450)</td>
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#### Comment

Mild neutropenia

### Appointment 2

- October 14
- Results of bloods:
  - Antiphospholipid antibodies (specialist didn’t want to do anything about this due to normal platelets and no history of clots) but I did:
    - Increased B12
    - Multi mineral
    - B6
    - Herbal immune formula
    - Continue ATP fuel
    - NADH support
  - Thorne methylguard - Methylcobalamin B6, 5-MTHF, Trimethylglycine
  - Indole 3/ DIM/ sulphuraphane
  - Increased B12
  - Multi mineral
  - B6
  - Herbal immune formula
  - Continue ATP fuel
  - NADH support
**Appointment 3**

- Energy now 6/10 every day
- Digestion still not good but not following diet very well. Allergies seem to be as bad.
- Mood much better – less stressed and feels much happier
- Doing more exercise
- Sleep still good

- Stressed how important diet was. Added in low histamine
- Started to increase methylfolate more
- Introduced DHA Omega
- CoQ10
- Antioxidant Calcium/magnesium
- Continue ATP fuel

**Bloods**

- Blood glucose good
- Ferritin 81
- Homocysteine now 5.2
- Oestrogen metabolism much better – 16Oh had reduced, 20h had increased.

**Appointment 4**

- Energy 7/10
- No diarrhoea since cut out the fruit and low histamine diet
- No migraines
- Mood great, anxiety nil
- Feels really good.

- Gave her the ok to actively start trying for pregnancy
  - Introduced Nattokinase for antiphospholipid syndrome
  - Continue autoimmune formula
  - Dropped:
    - sulphurphane/D3/DIM
    - Multi mineral
    - NAC

**Appointment 5**

- Pregnant
  - Now on 400mg folic, 400mg folate plus an additional 800mg methylfolate
  - Gut
    - Fantastic, no issues at all. Very strict with diet

December 15 – Gave birth to a little girl. Slight tongue tie, nothing significant.
No issues with pregnancy
Feels fantastic
Is continuing her prenats while breastfeeding.
Case History 3

53 year old female

Key issues
1. Fatigue 2-3/10. Works 12 hours a week, but is so exhausted (post breast cancer)
2. Anxiety 10/10 – avoids social situations. Started when she had to move back form the US to here.
3. Sleep – waking through the night a lot. Lies awake worrying about things all the time.
4. Memory terrible – can’t think of words/ can’t remember things well. Put this down to a post menopausal issue.
5. Had oestrogen positive breast cancer. Mother also had it.

Bloods
- Compound heterozygous MTHFR
- Serum folate low: <4.5 nmol/L (4.5–9 nmol/L)
- MCV 95 fL
- Homocysteine – 15.7 umol/L
- Vitamin B12 214 pmol/L
- Active B12 103 pmol/L.
- Vitamin D 127
- Glucose 5.0 mmol/L
- Vitamin B6 low and 17.6 ug/L.
- Copper 17
- Zinc 9

Appointment 1

11 June 2015
- B12 injection every 2 weeks
- Phosphatidylserine – 2 tds to help with cortisol levels
- ATP fuel – 5 caps bd.
- Gluten free
- Limit dairy
- Cut out green smoothies

Appointment 2

8 August
- Anxiety has reduced from 10/10 to 6/10
- Sleep is so much better with the B12
- Energy has gone from 2/10 to consistent 7/10
- Added in:
  - B formula with B1,2,3,5,6
  - Continue Phosphatidylserine 2 caps tds
  - Give B12 – methylcobalamin
  - Continue ATP fuel at 5bd
  - Zinc 50mg
  - Slowly introduce methylfolate ¼ tab per day working up to 1 tab.
Appointment 3

- Mood is fantastic
- Not flustered at all
- Anxiety is 70% better
- Energy amazing

To improve anxiety further:
- Continue to increase folate levels

7 November

Appointment 4

- Feeling great!
- Energy is the best it has ever been

16 December

Case History 4

54 year old female

Key issues
1. Migraines regularly with aura. Takes her 3-7 days to recover
2. Fibromyalgia – since a child, very sensitive skin, extremely sore muscles (ad analgesic injections regularly but didn’t help). Stiffness in neck, shoulders and legs
4. Motivation low
5. BP high 140/90 and that’s with Atacand.
6. Overweight – currently 117kg. 15 years ago she was 79kg.
7. Restless leg syndrome – Mum and sister have as well.
8. Current medications:
   1. Pristiq 100mg
   2. Atacand 4mg
   3. Venlafaxine

Case History 4

Key issues con’t
9. History of asthma and constant rhinitis
10. Crustacean allergy
11. Family history of:
   - Hashimoto’s, osteoarthritis, hypertension, dementia, melanoma
12. Sleep terrible – up through the night with pain.
13. Energy early morning 1/10 and again in evening and increases at some point during the day to 4-5/10
14. Perimenopausal
15. Heart palpitations
16. Tingling, numbness, pins and needles in feet
17. Moderate anxiety and depression.
Case History

- Bloods
  - Homozygous A1298C
  - Homocysteine 11.6
  - B12 serum – 446
  - Zinc 12
  - Copper 18
  - Ferritin 115
  - TSH 1.8
  - Vitamin D – 32
  - Cholesterol 5.2
  - Triglycerides 9

Appointment 1

- Hydroxocobalamin 2,000mcg
- B formula with B1,2,3,5,6
- Thorne Pic Mins 2 per day
- ATP fuel – 5 bd
- Thorne BPP – 1 tds with meals
- Continued with the magnesium she was on
- Vitamin D – 3,000IU's
- Diet – low histamine

Appointment 2

- Energy gone from 1/10 in the morning to 4/10
- Fibromyalgia symptoms have improved
- Sleep much better
- Brain fog – better and less headaches
- Mood/anxiety/depression all a bit better
- Has started to lose a bit of weight. Clothes feel looser
- Not been very good with her diet.

Appointment 3

- Energy 7/10 consistently
- Went for 6 weeks without a migraine. She has never done that. Was more compliant about her diet.
- Brain fog is gone. Feels amazing
- Hasn’t had restless legs for ages
- Stools are floating less
- Been very stressed at work so BP all high – 156/90
- Digestion good
- Added in methyl folate ¼ tab.
- Feeling better off the gluten.
- Added in Turmeric.
Case History 5
35 year old female

Key issues
1. Fatigue really bad. Is young but feels old. So tired that she gets out of bed to see her husband off and has to go back to bed once he leaves the house for 3-4 hours. Can barely drag herself around
2. Started after she had a really highly stressed job. Was working really long hours for years and finally collapsed in a heap and had to resign.
3. Lost all her motivation
4. Has put on 14 kg over the last year
5. Mood pretty low 2/10. Cries through much of the first appointment
6. Anxiety 10/10
7. Cravings chocolate all the time
8. Energy dipping a lot throughout the day
9. No cycles

Bloods
- MTHFR Compound heterozygous
- Homocysteine 11.6
- B12 serum – 446
- Zinc 12
- Copper 10
- Ferritin 11.5
- TSH 1.8
- Vitamin D – 32
- Cholesterol 5.2
- Triglycerides 0

Appointment 1
Aug 2014

- Magnesium glycinate – 400mg at night
- ATP fuel 5 bd
- B12 – 2,000mcg per day
- Digestive enzymes with each meal
- Zinc – 50mg per day
- Manganese – 2 per day

Appointment 4
7 March

- Energy 7/10 every day all day. Weekends it could even be 9/10.
- Fibromyalgia symptoms really good when she wishes, but broke her foot and it’s been hard since she did that. Set her back a bit.
- Mood good
- BP 130/85
- Dropped ATP fuel back to 5 per day
- Really focusing on diet now to reduce weight

Case History

Bloods
- MTHFR Compound heterozygous
- Homocysteine 11.6
- B12 serum – 446
- Zinc 12
- Copper 10
- Ferritin 11.5
- TSH 1.8
- Vitamin D – 32
- Cholesterol 5.2
- Triglycerides 0

Appointment
Aug 2014

- Magnesium glycinate – 400mg at night
- ATP fuel 5 bd
- B12 – 2,000mcg per day
- Digestive enzymes with each meal
- Zinc – 50mg per day
- Manganese – 2 per day
Appointment 2

- Energy gone from 0/10 in the morning to 5/10
- Chocolate cravings so much better
- Her need for food is not as bad.
- Is starting to exercise
- Not having to sleep as much

- Introduced methylfolate ¼ and working up to 1 full one per day

Appointment 3

- Cycle started as soon as she started taking the supplements
- No drop in mood mid cycle. Not nearly as tired when she menstruates.
- No chocolate cravings
- Has lost 5kg since first appointment.
- Energy 8/10. Can exercise regularly now, is walking the dogs every day. Hasn’t done that for over a year.
- Mood has improved significantly

Appointment 4

- Energy 7-8/10 every day all day. Weekends it could even be 9/10.
- Fibromyalgia symptoms really good when she wakes, but broke her foot and it’s been hard since she did that. Set her back a bit.
- Mood good
- BP 130/89

- Dropped ATP fuel back to 5 per day
- Really focusing on diet now to reduce weight

How do I use Transfer Factor?

- If I suspect viral infection I combine transfer factor with either Plasmyc or Lyme plus
- The patient must be on methylfolate in it.
- Work up to two caps 3 x day.
Signs and symptoms of non utilisation of methyl's

- Headache
- Migraine
- Rashness
- Irritability
- Increase in anxiety
- Joint pain
- Muscle pain
- Ixness
- Depression - may be suicidal
- Nausea

If side effects happen – take action

- Neutralise side effects from methylfolate as soon as you can

- 50-100mg of nicotinic acid OR niacinamide every 30 minutes to 1 hour - use only as needed

THANK YOU AND QUESTIONS

CONTACT US:

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