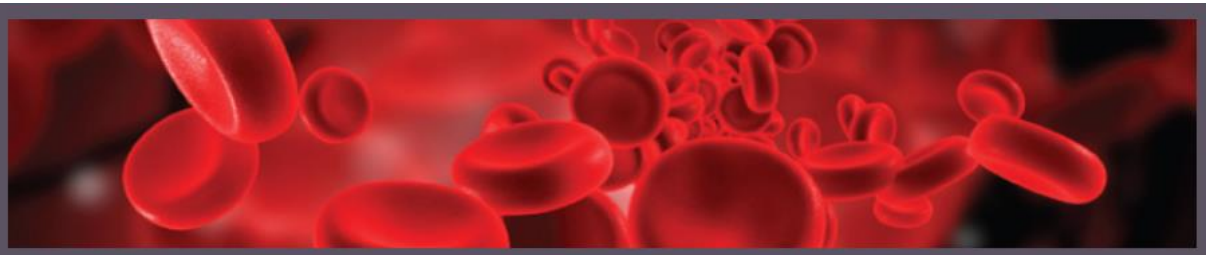
MTHFR: the role in cardiovascular disease

Naturopath and MTHFR Support Australia Founder

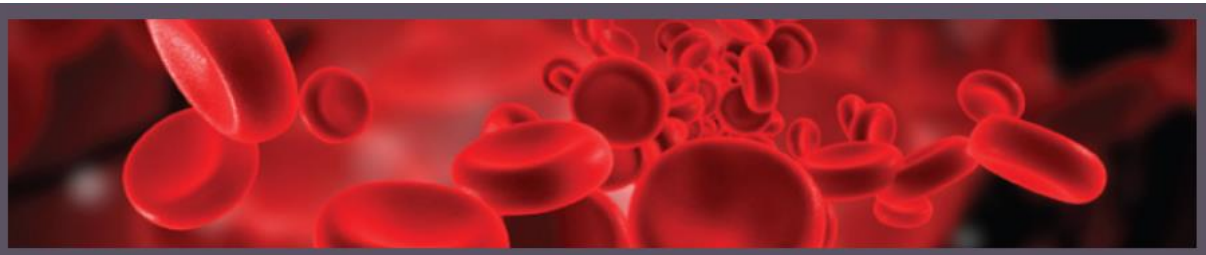
Carolyn Ledowsky

MTHFR SUPPORT Australia



Housekeeping

- Download slides and handout pack from our website, link provided in tonight's reminder email
- Shut down all other applications on your computer to allow the webinar to run the best quality it can
- Recording will be available 48 hrs after the live event



Carolyn Ledowsky
Founder MTHFR Support Australia

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Disclaimer

- The information that I am presenting today is for information only and you must not rely on the information in this webinar as an alternative to medical advice from your Doctor or specialist

- I have no affiliation with any vitamin manufacturer

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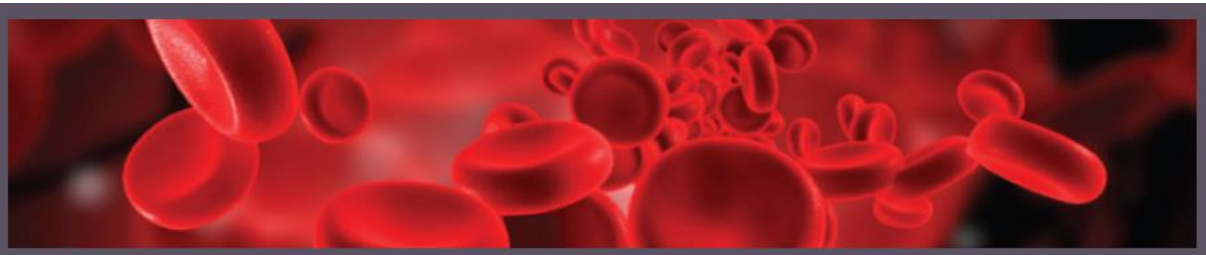
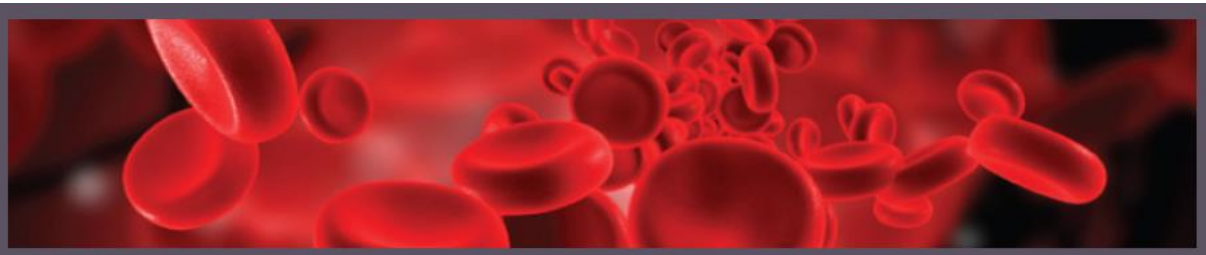


In this presentation you will learn

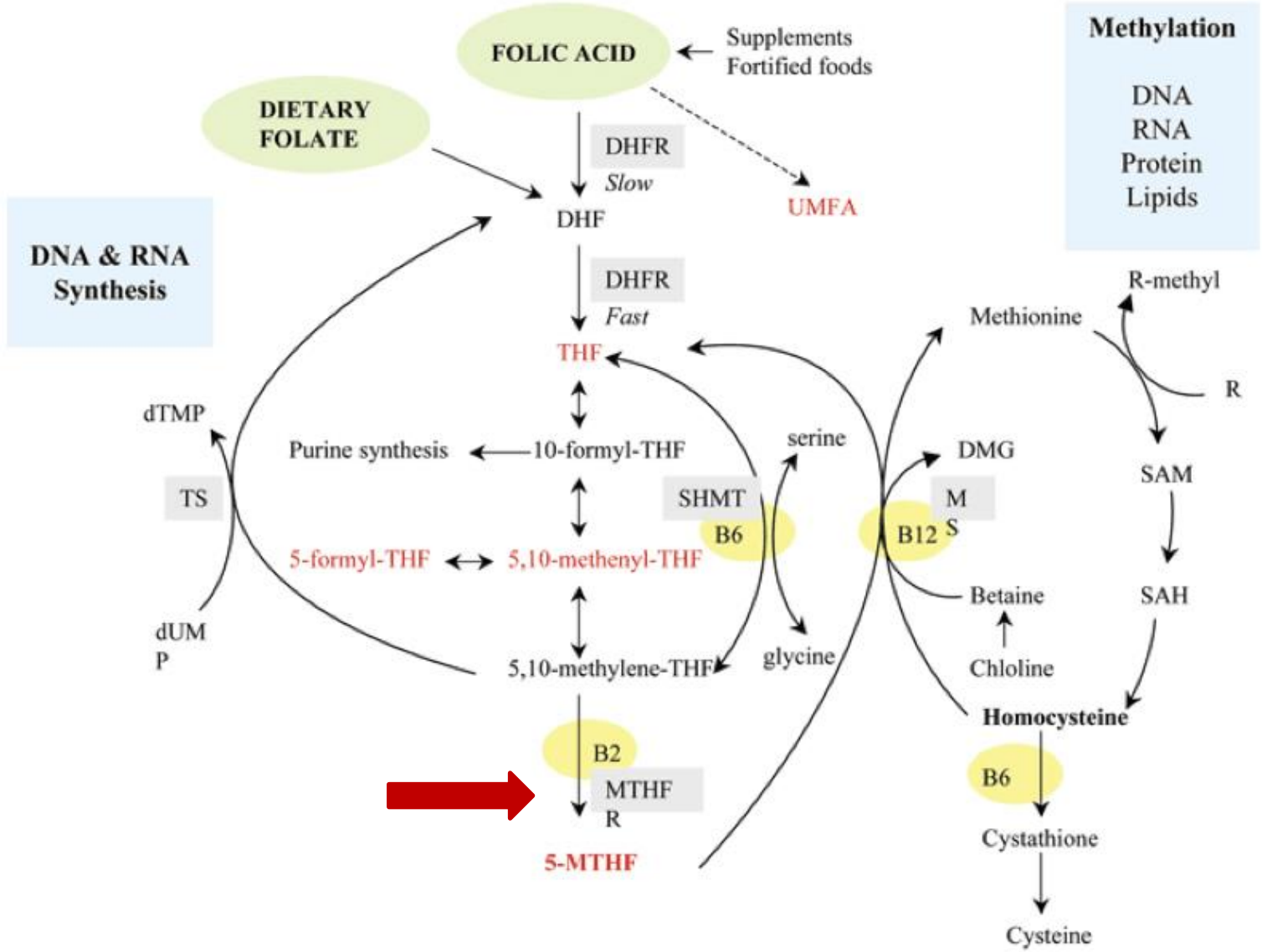
- What is MTHFR
- What is cardiovascular disease
  - deep vein thrombosis
  - stroke
  - early heart attack
  - increased blood clotting
  - high cholesterol
  - High blood pressure
- How and why does MTHFR impact cardiovascular health
- What can be done to support you to maximise health and wellbeing



What is MTHFR?

- MTHFR stands for

  methylene-tetrahydrofolate reductase
- An enzyme that converts folate you eat into the active form (5-methyltetrahydrofolate)
- The folate you eat (DHF-dihyrofolate) needs conversion via many steps to the active folate 5-MTHF
- The MTHFR enzyme works at the last step
  - if you have a mutation in the gene then its going to be affecting how much active folate you have available



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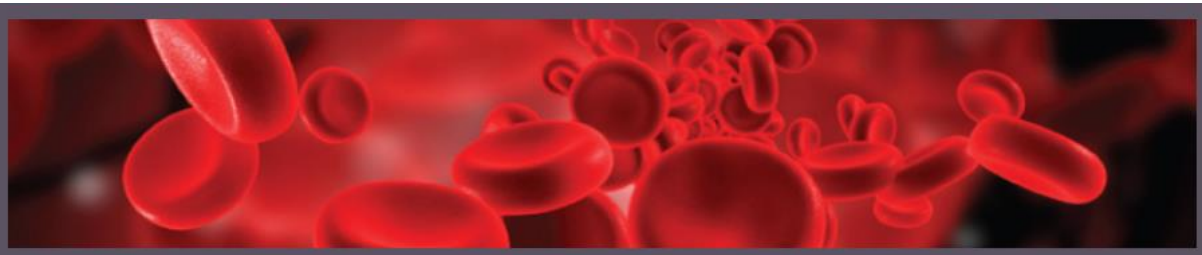
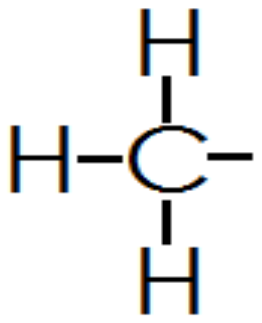


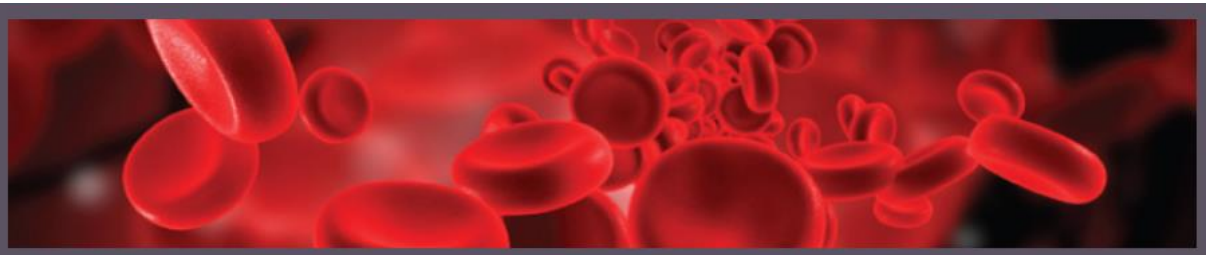
MTHFR – a key aspect of methylation

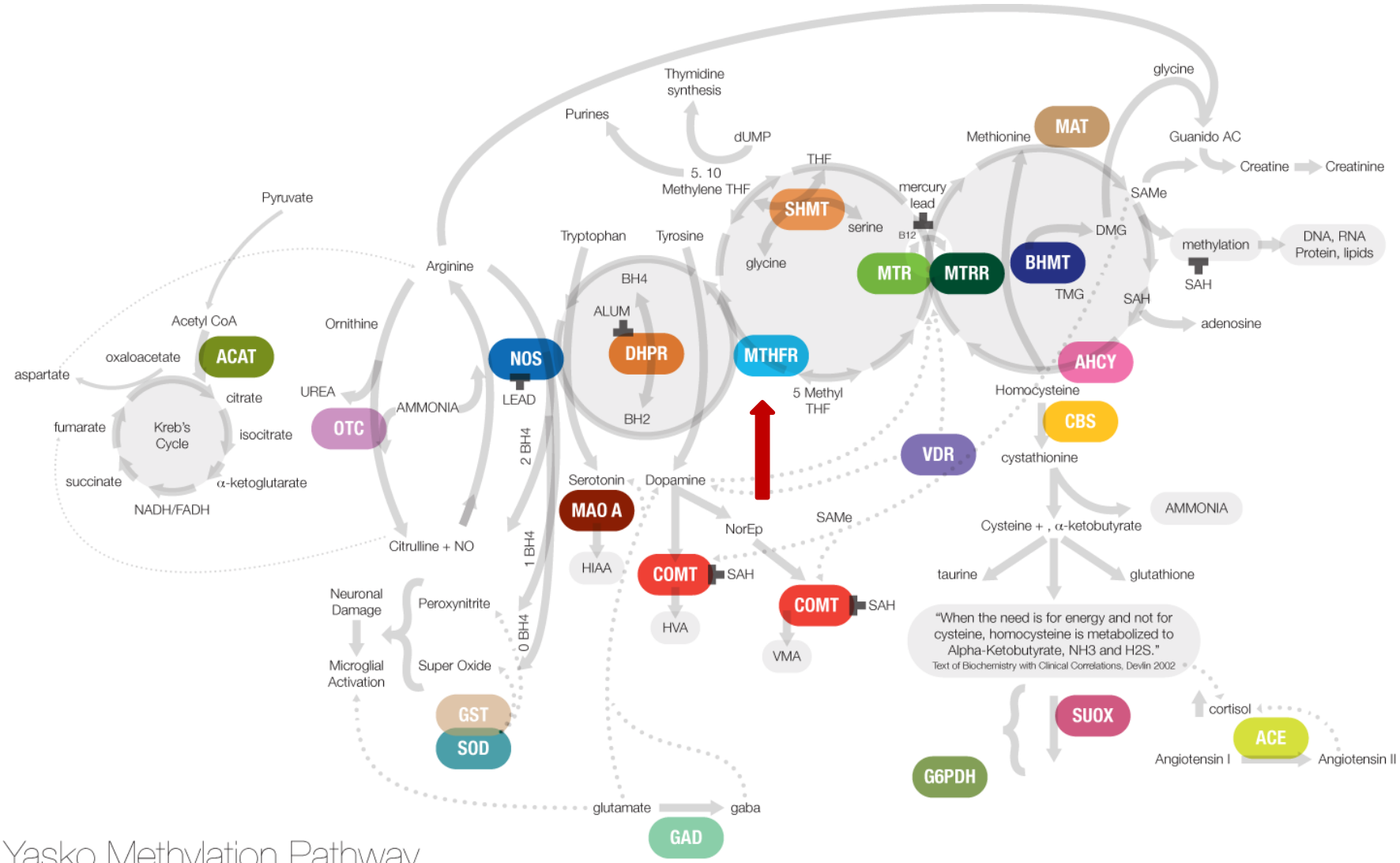
What is methylation?

- 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 function properly

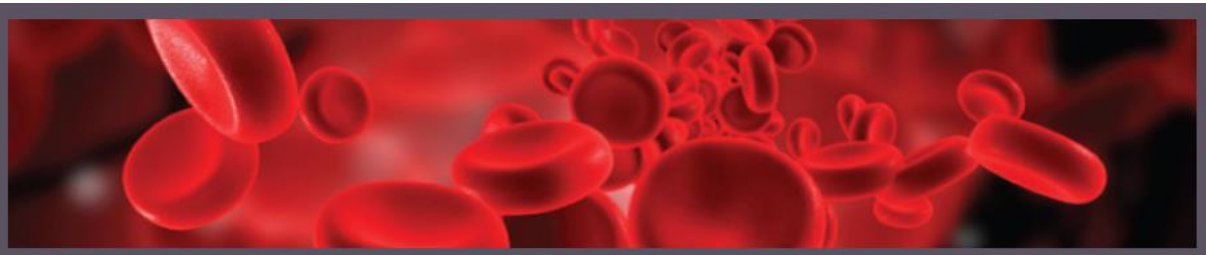


methyl group





Yasko Methylation Pathway



What affects methylation

Environmental toxins
e.g. pollution & bisphenol A

Chemicals & heavy metals
e.g. lead, mercury, smoking

Stress
both mental and physical (including exercise)

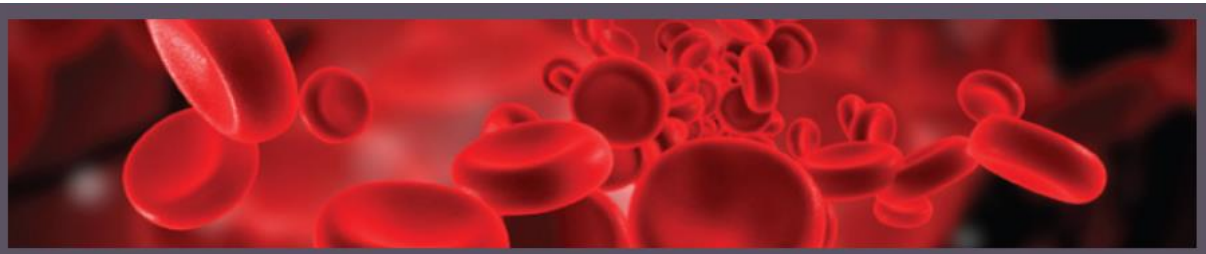
Medications
e.g. antacids & methotrexate

Ageing

Diet

Alcohol

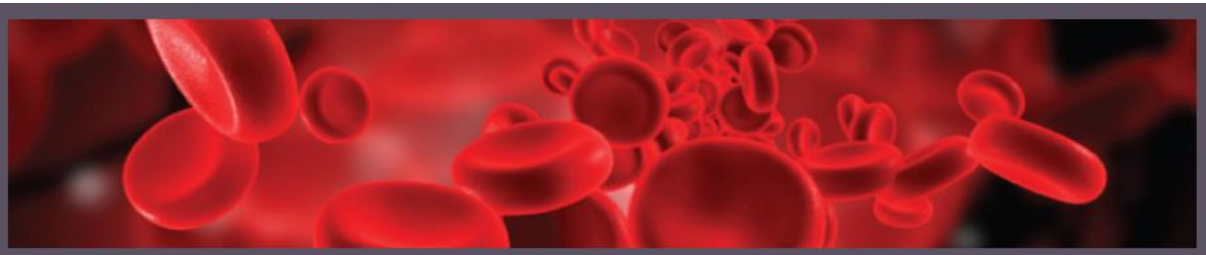
www.nature.com/news/2010/100113/full/news.2010.7.html
www.anma.org/pdf/Methylation_by_Dr_Jack_Tips_Complete_and_Illustrated_Article.pdf



What is cardiovascular disease (CVD)?

- A problem of the vascular system
- Diseases of the heart and blood vessels including:
  - Coronary heart disease
  - Stroke
  - Heart failure
  - Hypertension –high blood pressure
  - Thromboses

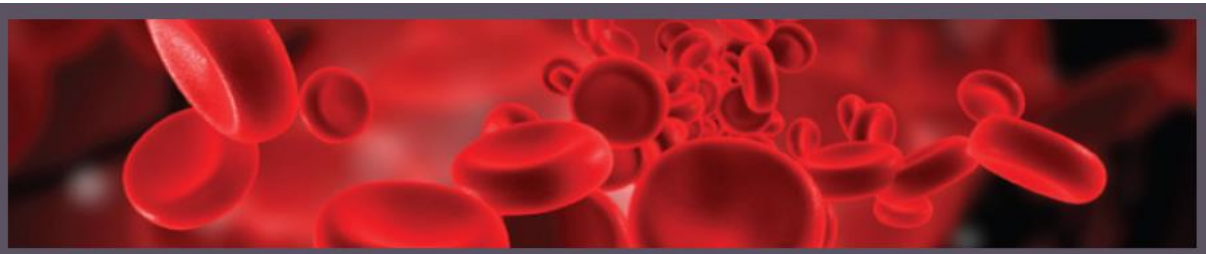
www.health.gov.au/internet/main/publishing.nsf/Content/chronic-cardio



Stroke

- Occurs when an artery supplying blood flow to part of the brain becomes blocked (ischaemic) or bursts (haemorrhagic)
- Results in part of brain becoming starved of oxygen and vital nutrients that ensure healthy function

www.heartfoundation.org.au/your-heart/cardiovascular-conditions/Pages/stroke.aspx



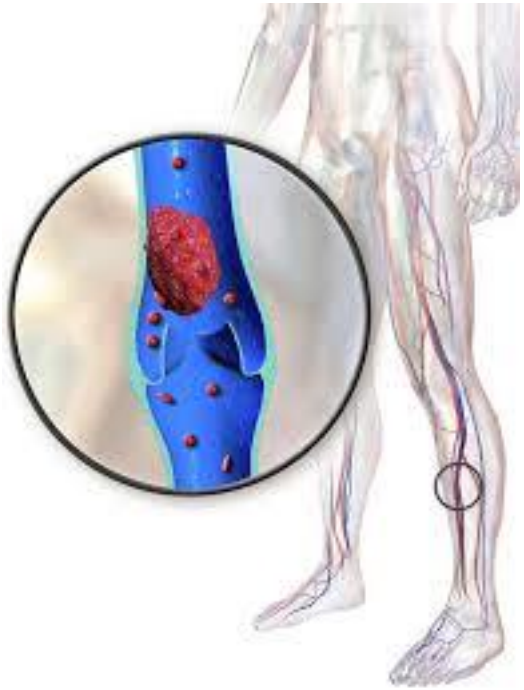
Heart attack

- A sudden or complete blockage of an artery that supplies blood to an area of your heart (coronary artery)
- Resulting in heart muscle death
- Referred to as myocardial infarction (MI), acute MI, coronary occlusion or coronary thrombosis

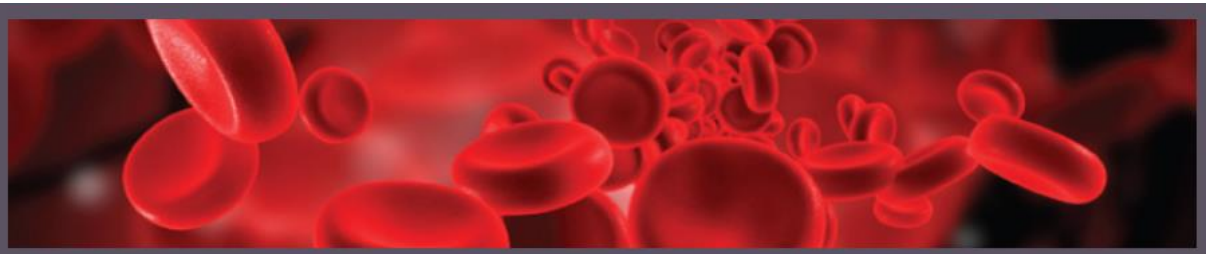
www.heartfoundation.org.au/your-heart/cardiovascular-conditions/Pages/heart-attack.aspx

Deep vein thrombosis

- A blood clot in one of the deep veins of the body
- Left untreated, risk of dislodgement and blockage in lungs – pulmonary embolism
- Caused by injury, surgery, sitting/lying for long periods

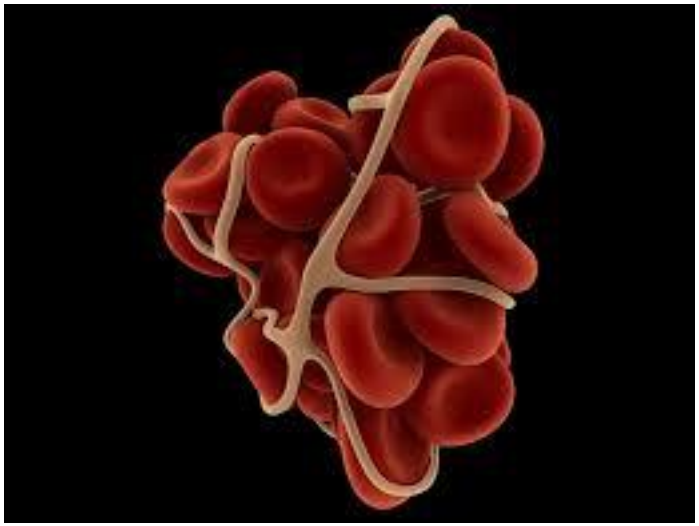


www.heartfoundation.org.au/your-heart/cardiovascular-conditions/Pages/deep-vein-thrombosis.aspx

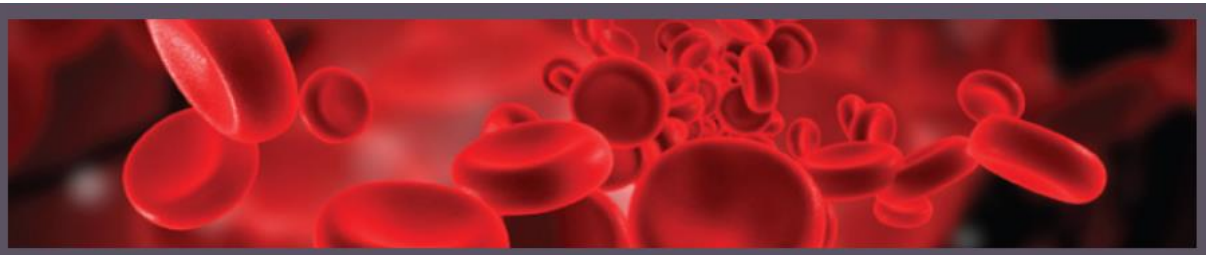


Increased blood clotting

- Your body naturally forms blood clots to help stop bleeding after injury, this is called coagulation
- Hypercoagulation - blood clots form too easily or don’t dissolve properly and travel through the body limiting or blocking blood flow



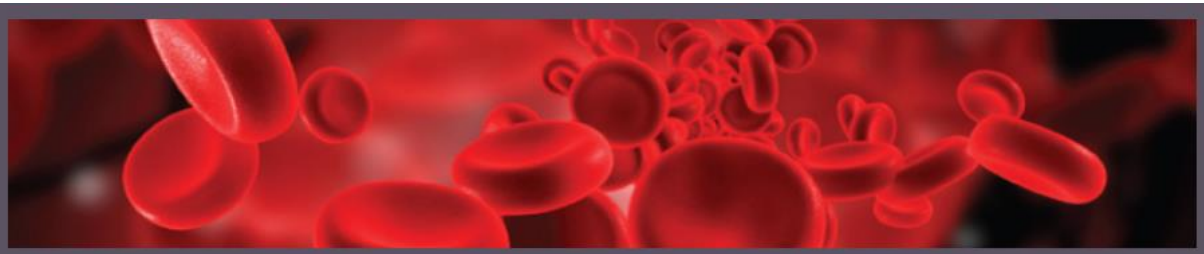
www.heart.org/HEARTORG/Conditions/More/What-Is-Excessive-Blood-Clotting-Hypercoagulation_UCM_448768_Article.jsp



Raised cholesterol

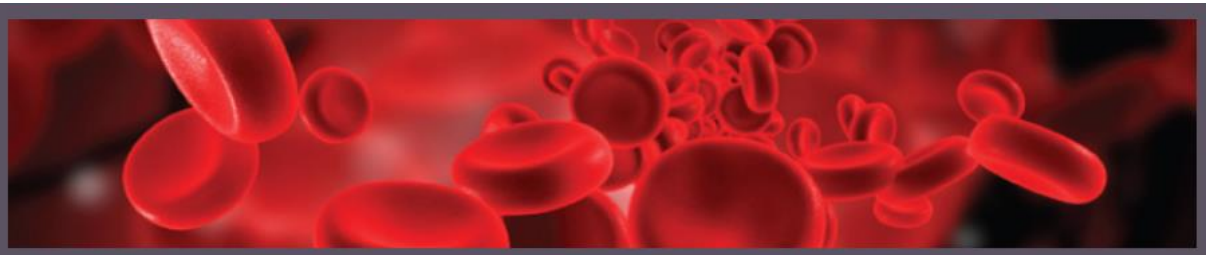
- Cholesterol - an important fatty substance, naturally produced by your body as well as being consumed through food
- If blood levels get too high, fatty deposits build up gradually in blood vessels – restricting flow and leading to eventual heart attack or stroke

www.heartfoundation.org.au/your-heart/cardiovascular-conditions/Pages/high-cholesterol.aspx



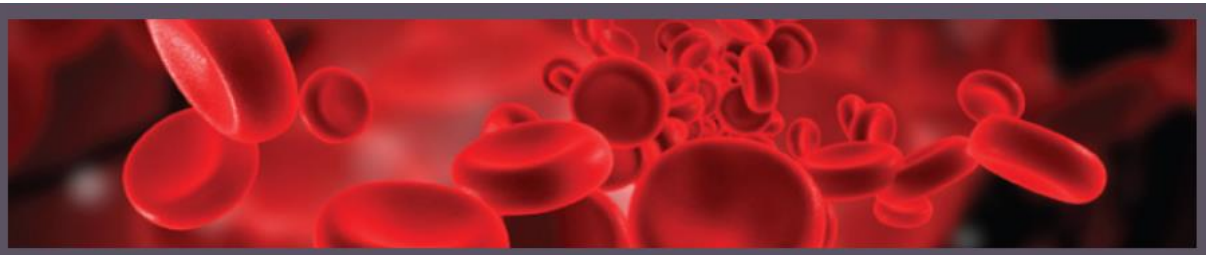
CVD risk factors

- Hypertension
- Elevated cholesterol
- Overweight and obesity
- Limited/no exercise
- Low fruit and vegetable intake
- Alcohol consumption
- Smoking
- …and MTHFR gene polymorphism



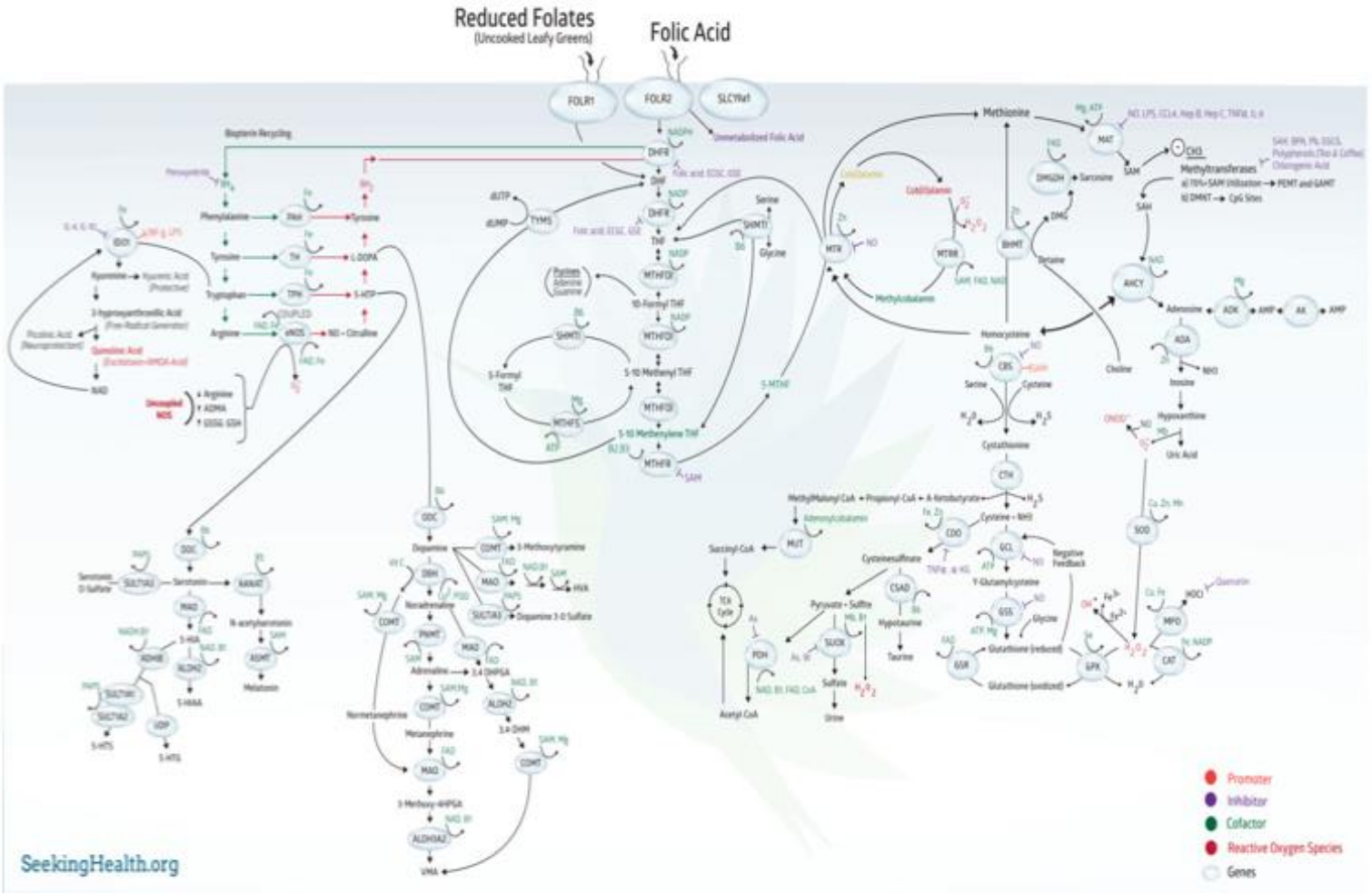
Where does MTHFR fit?

- Homocysteine – optimal level 7-7.5 umol/l
- Too low is as bad as too high
- Important correlation between MTHFR, nitric oxide, hydrogen sulfide and a number of biochemical pathways



SeekingHealth® Educational Institute

Pathway Planner



Acknowledgement: Dr Ben Lynch of MTHFR.net

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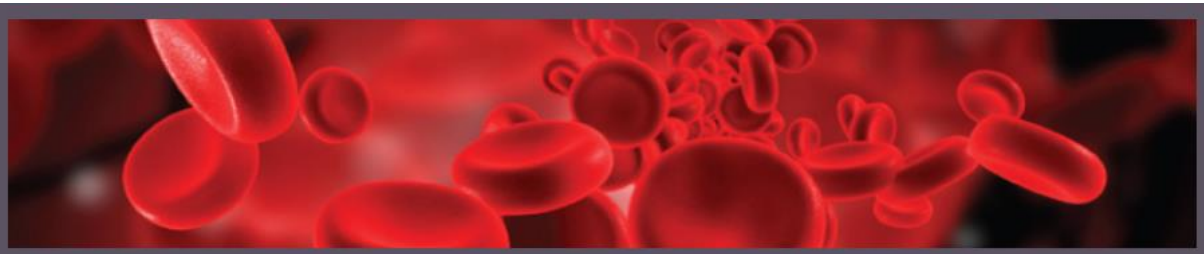
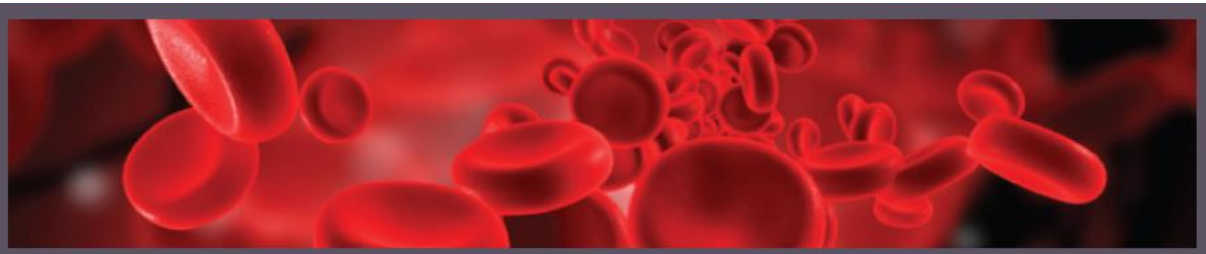


Benefits of nitric oxide

- Stimulate dilation and sustained relaxation of arteries
- Decreases platelet and macrophage adhesiveness (blood clots)
- Keeps blood vessels pliant and elastic
- Regulates oxidative enzymes preventing free radical damage
- Slows plaque growth

http://circ.ahajournals.org/content/97/12/1129.long



Nitric oxide (NO) connection

Homocysteine preferentially goes backwards → Biochemical imbalance → NO imbalance

NO imbalance → Endothelial dysfunction → Hypertension, stroke, MI, cholesterol, vasospasm

www.ncbi.nlm.nih.gov/pubmed/24004894; www.clinchem.org/content/44/8/1809.full.pdf+html
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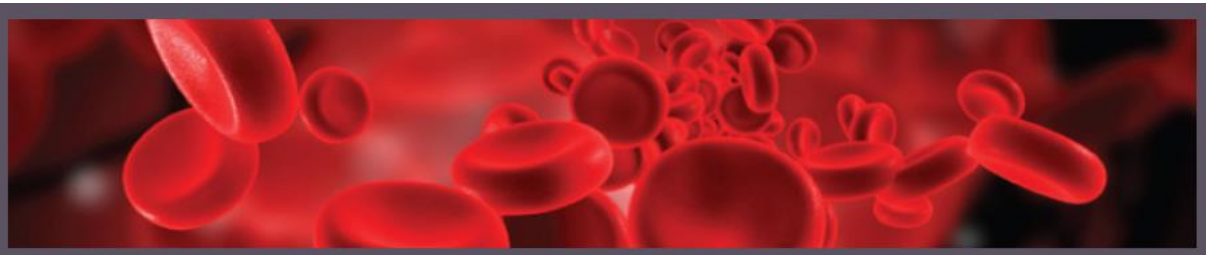

Benefits of hydrogen sulfide

- Dilation of blood vessels
- Angiogenesis – the making of new blood vessels
- Anti-adhesive and anti-inflammatory properties
- Increases nitric oxide
- Protects from ischaemia
- Supports production of antioxidants
- Supports glucose metabolism

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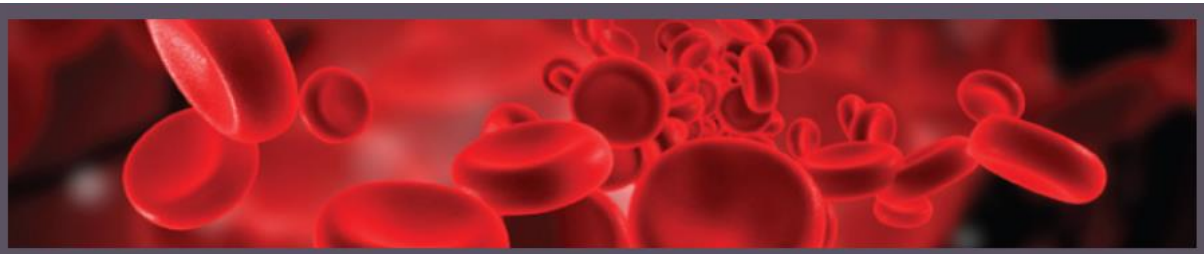

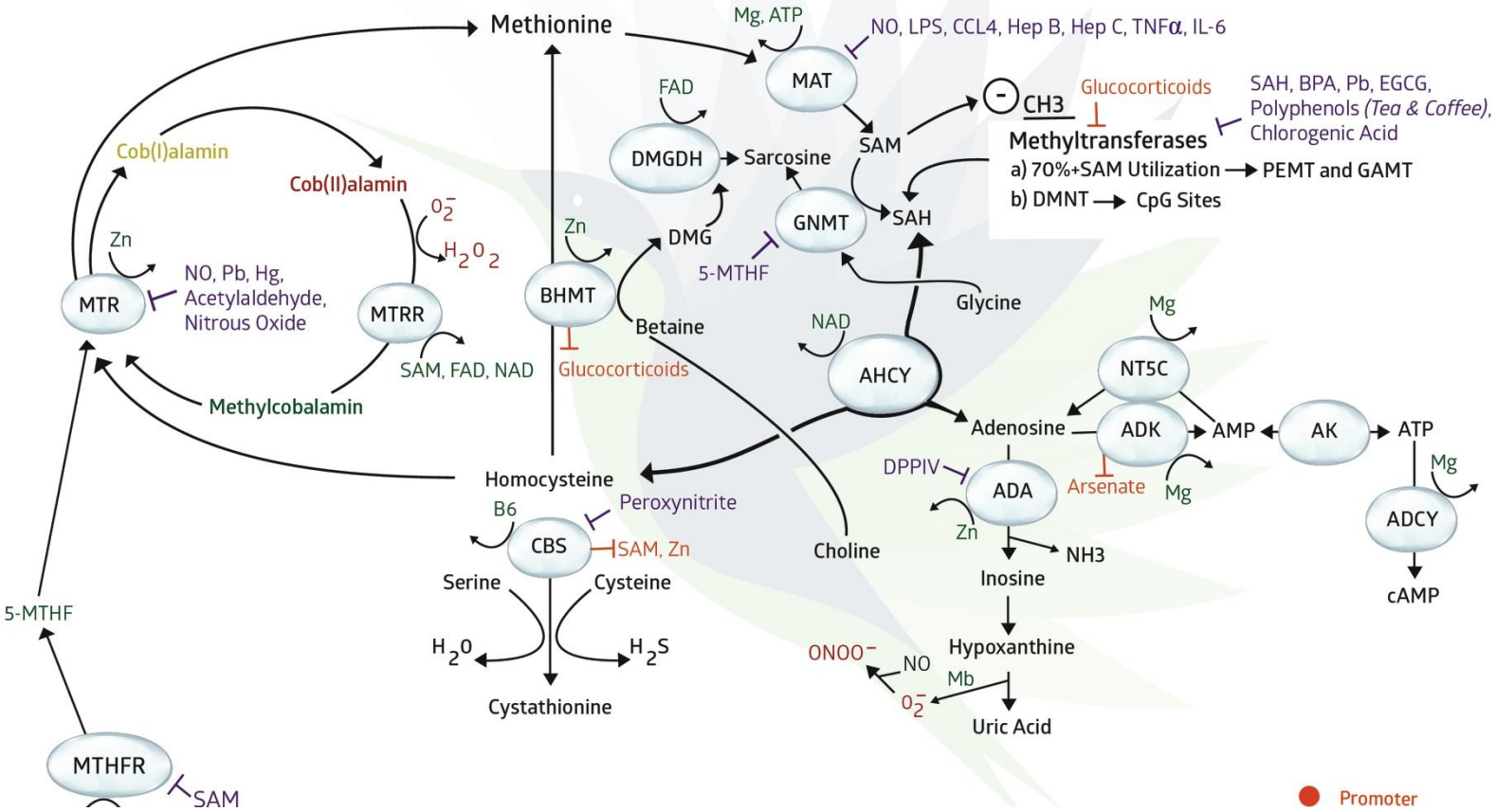

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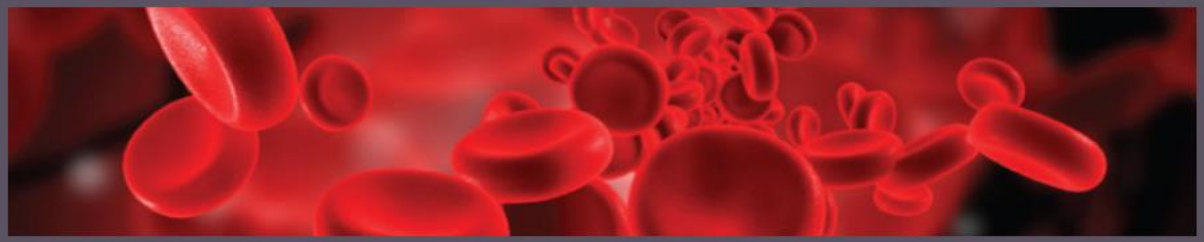
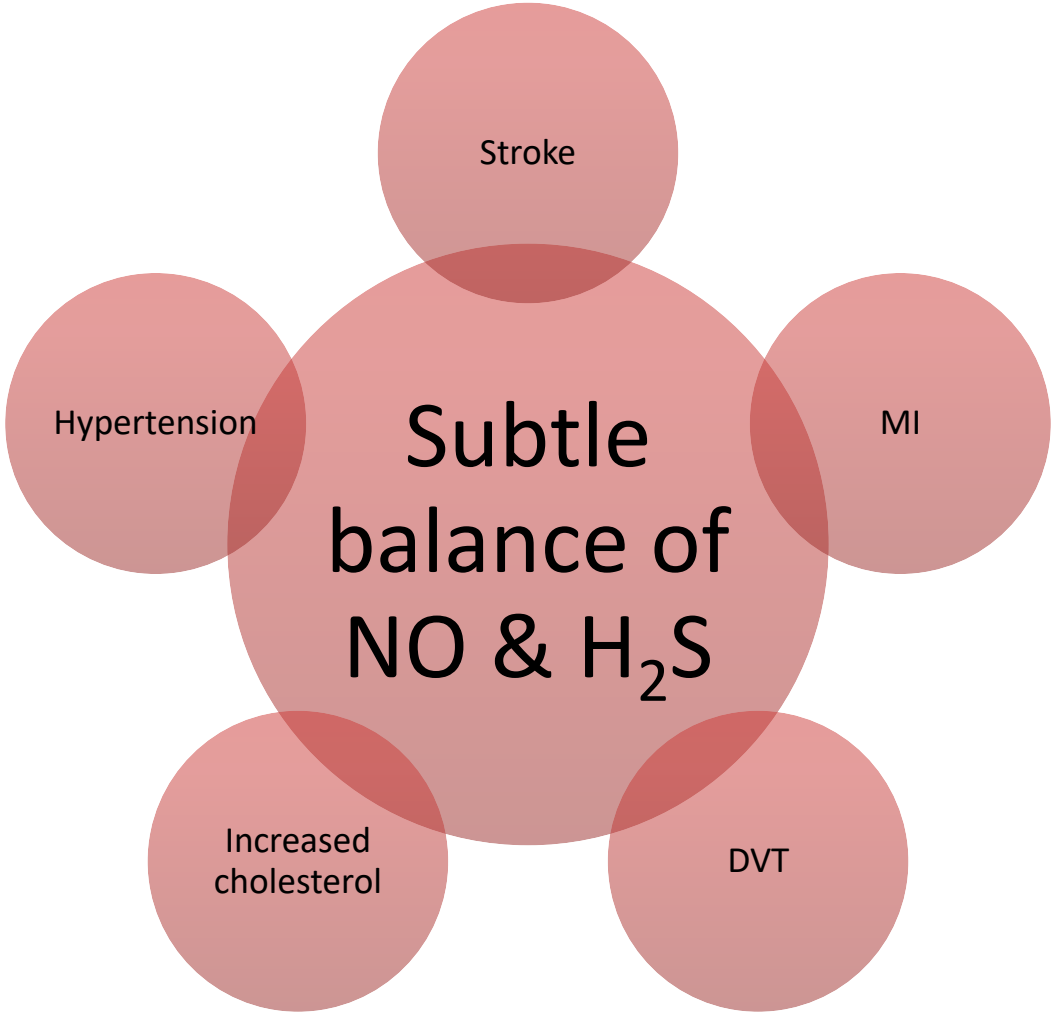
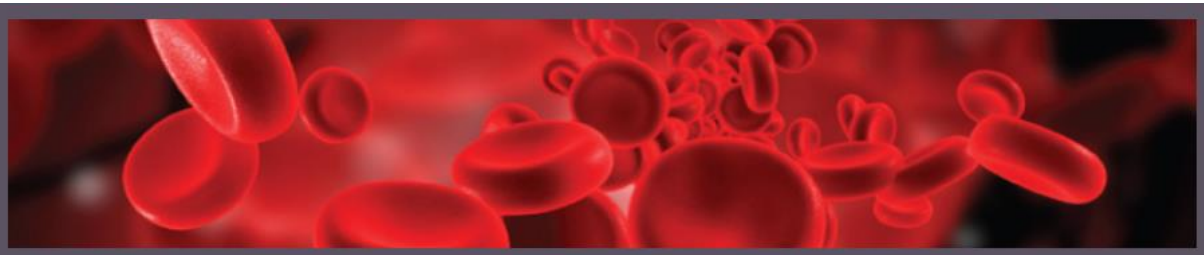



Stroke
Hypertension
MI
Subtle balance of NO & H_2S
Increased cholesterol
DVT

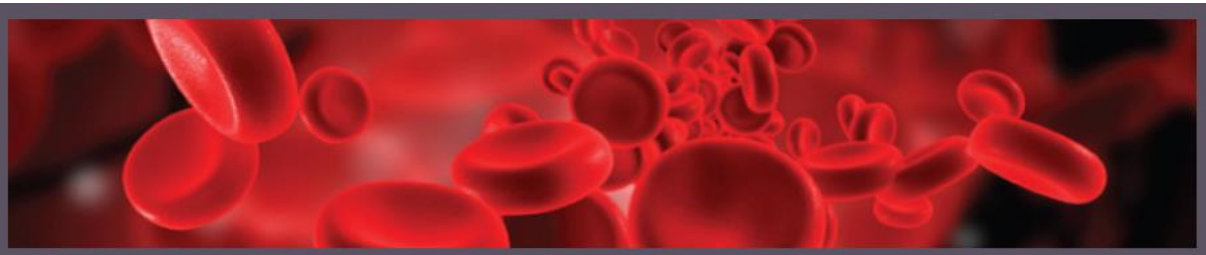


Fat metabolism & cholesterol

MTHFR is associated with disturbed fat metabolism

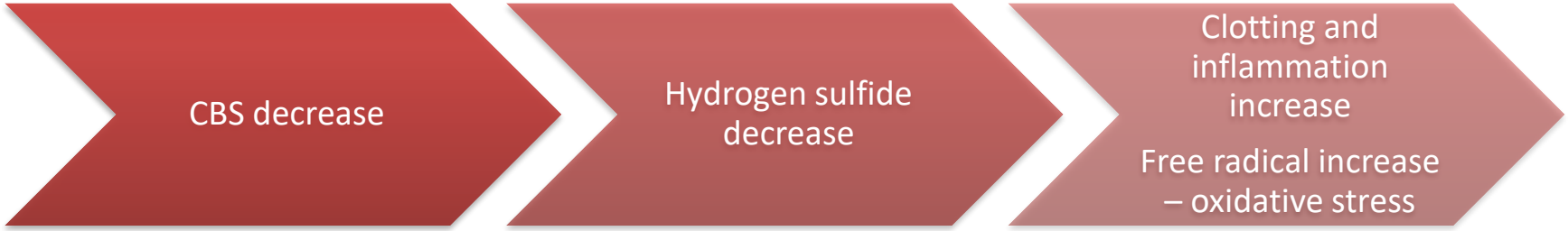
Homocysteine increase → SAMe decrease → Increase in saturated fatty acids

www.hindawi.com/journals/jl/2011/702853/



DVT and blood clots

MTHFR is associated with anti-adhesion and anti-inflammatory effects



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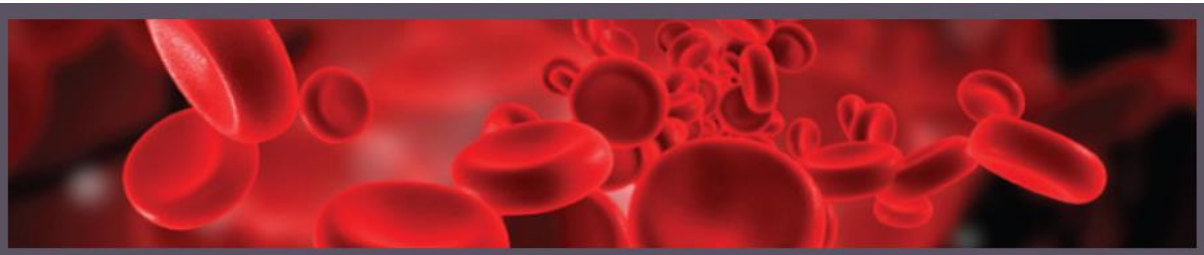
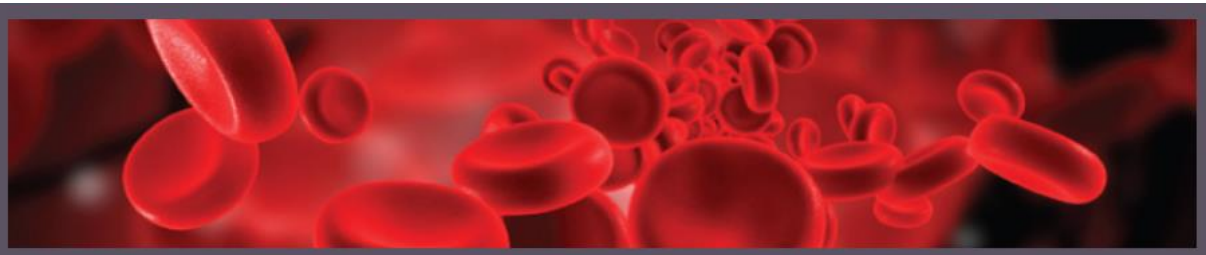


MTHFR gene mutation

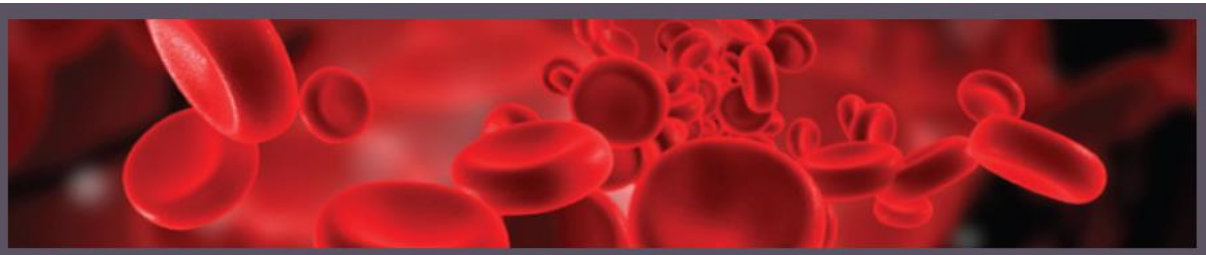
MTHFR 677TT genotype are at significantly higher risk of CVD



Epigenetics

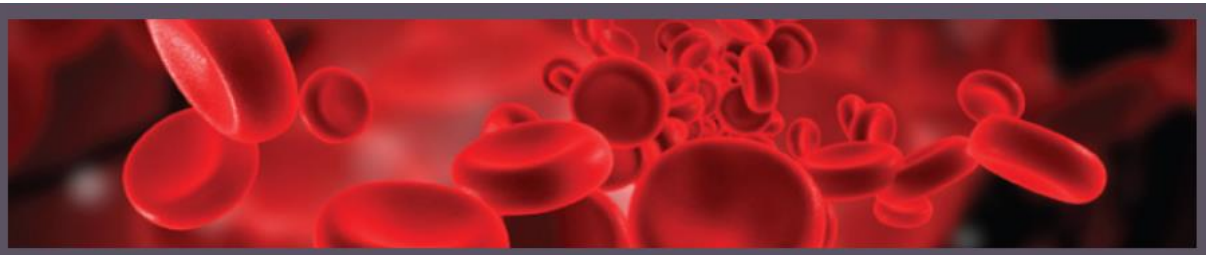
- Your genetic make up cannot change but epigenetics can change

- Epigenetics involves the way the environment impacts the molecules in your body which then can impact your genes



So what can we do about it?

- Diet and lifestyle
  - Feeding your heart
- Supplements
  - Supporting your body



Diet & lifestyle for cardio health

- **Exercise –** support healthy NO function
- **Low processed food** - reduce inflammation and burden on detoxification pathways and systems of elimination
- **Increase or decrease sulphur foods –** depending on presentation

www.ncbi.nlm.nih.gov/pmc/articles/PMC1665322/
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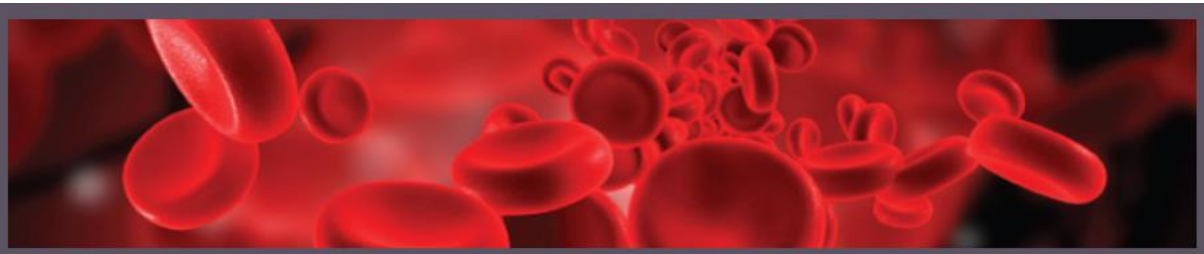
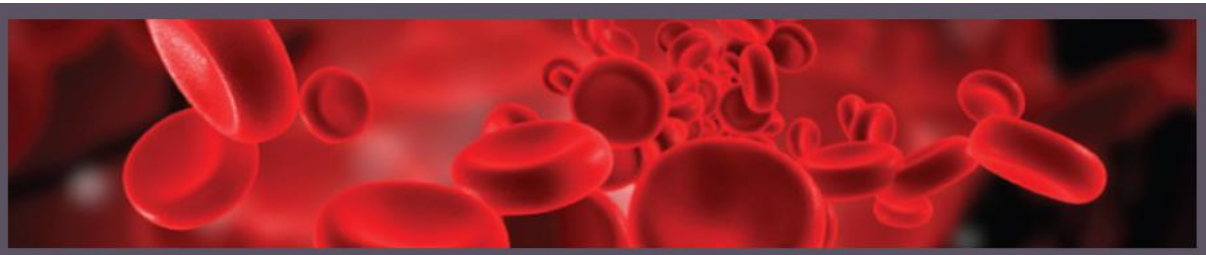


Diet & lifestyle for cardio health

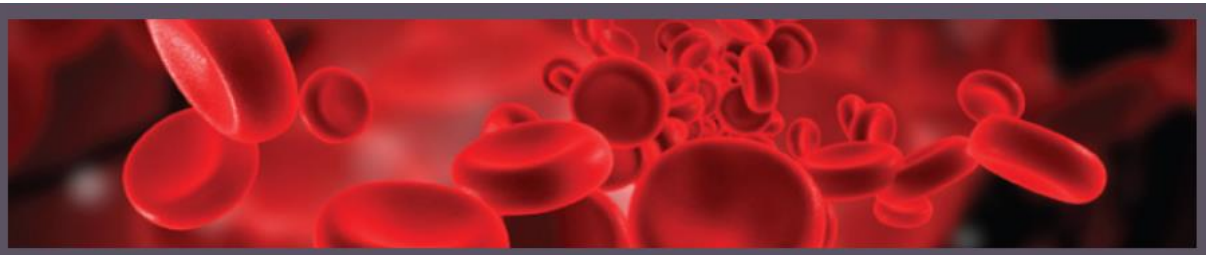
- **Low alcohol –** no more than 2 standard drinks per day. More leads to increased BP, and a higher risk of stroke
- **No smoking**
- **Healthy weight**

www.heart.org/HEARTORG/GettingHealthy/NutritionCenter/HealthyEating/Alcohol-and-Heart-Health_UCM_305173_Article.jsp



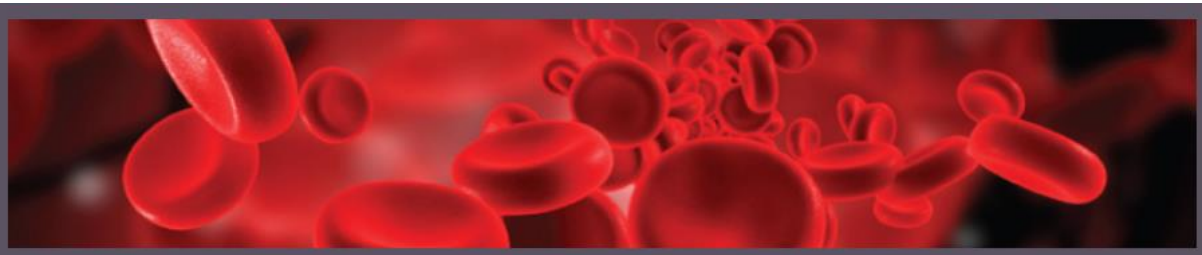
Diet & lifestyle for cardio health

- **High in vegetables** - alkalising, natural folate and anti-inflammatory action, think GREEN ☺
- **Modulate stress** – uses up methyl groups which are needed for healthy NO levels and endothelial health
- **Eat organic where possible** – handout in information pack



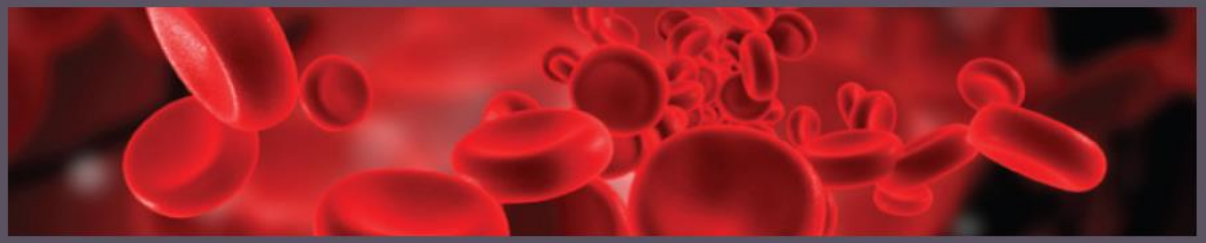
Feed your heart

- **Protein** - at every meal. Protein is essential for energy, neurotransmitters and methionine which builds methyl groups
- **Water** - clean filtered water, herbal tea
- **Coenzyme Q10 -** helps the heart to fire on all cylinders, vital if you are taking a statin medication to lower cholesterol
- **Pomegranate -** a remarkable superfood that protects endothelial health. It also enhances NO
- **Chlorella and coriander -** powerful detoxifying properties, work closely with your practitioner on this



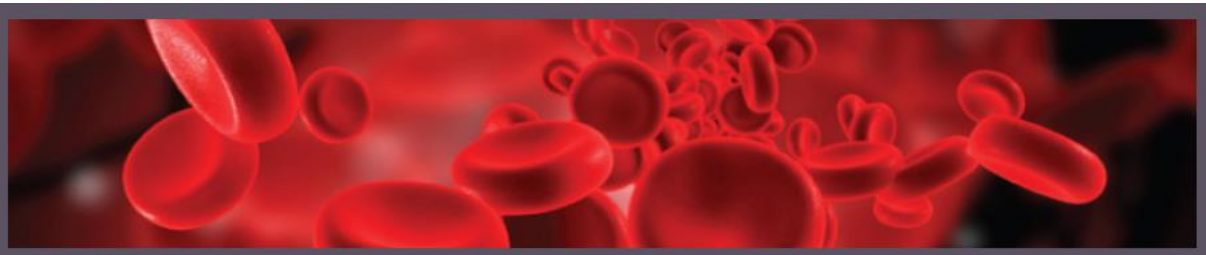
Supplement (if warranted)	Dose
Arginine	1g/day
CoQ10	150mg 1-2 per day
Magnesium	400mg twice/day
Methylfolate	Depending on snps but as little as 400mcg may be sufficient
Methionine	500mg/day
N-acetyl cysteine (NAC) (boosts glutathione levels	500mg/day
Phosphatidylcholine	500mg twice a day
Selenium	200mcg/day
Vitamin B6 as P5P	20-40mg/day (more if pyrroles)
Vitamin C	Up to 2,500mg/day

Kotsirilos V et al,2011, Integrative and complementary medicine, Churchill Livingstone; www.seekinghealth.com/best-supplements.html; Hechtman L, 2014, Clinical Naturopathic Medicine, Churchill Livingstone



Very important

- If you have cardiovascular disease you are more than likely on pharmaceutical medications. You must not take any of the above supplements without first seeking advice from your health practitioner. There are serious potential side effects of mixing medications/supplements.



A note on methylfolate

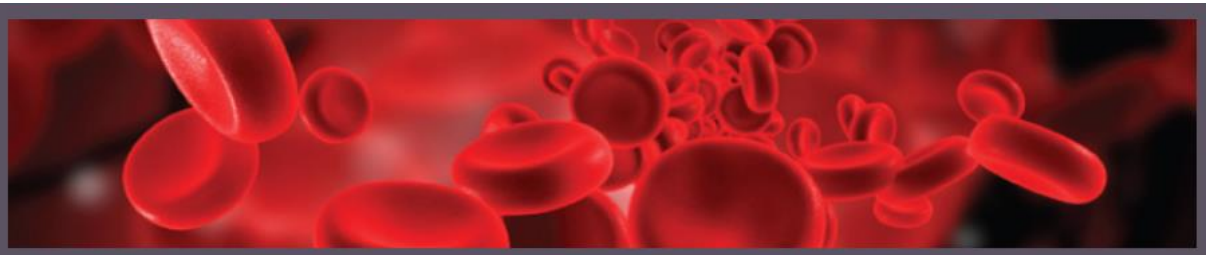
- Brands that you might like to use in the US :
  - Seeking Health www.seekinghealth.com
  - Iherb.com
    - Thorne
    - Xymogen
    - Allergy Research group
    - Jarrow formulas

In Australia we do not have access to 5-MTHF unless compounded by your health care practitioner.

YOU MUST AVOID FOLIC ACID

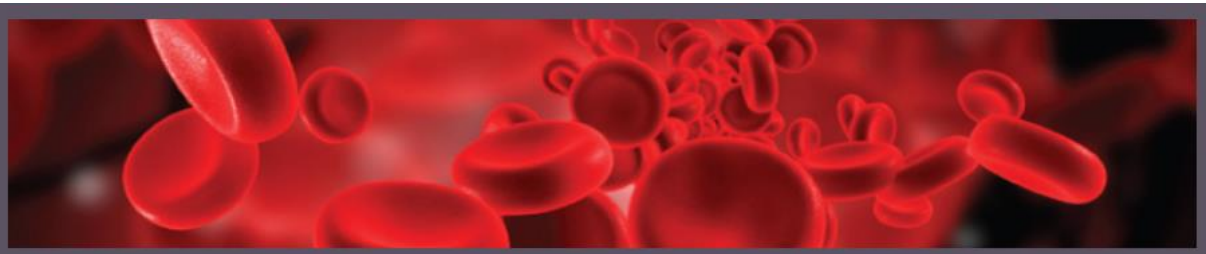
Important things to remember

- Don’t assume MTHFR therefore I must have big doses of 5-MTHF.
- Other mutations may require further assistance i.e.
  - PEMT/BHMT – choline
  - MTR/MTRR/FUT2/TCN1&2 – vitamin B12
  - COMT tolerates less methyl groups.
- Homozygous MTHFR C677T may require additional methyl folate/B12
- Check homocysteine levels to gauge how much work needs to be done



Bloods

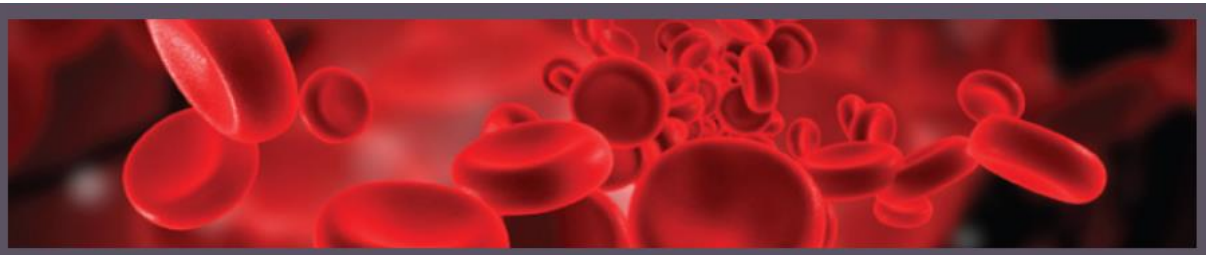
- Clues that your B12/B6 or folate status are low:
  - Low red cell count under 4 – may be B12/folate anaemia, B6 deficiency
  - Low haemoglobin – may be B6/B12/folate anaemia
  - High MCV –>90. B12/folate deficiency
  - RDW – increased i.e. over 13 if B12/folate/iron anaemia
  - Neutrophils low <4. May be due to B12/B6/folate anaemia
  - Low lymphocytes <2.4. May be due to vitamin B12/folate/B6 deficiency
  - Low platelets <155 may be due to B12/folate/selenium/iron deficiency
  - Elevated homocysteine >8
  - Low homocysteine <6
  - Lipids elevated i.e. cholesterol and LDLs



Important pathology investigations

- RBC folate/ B12
- Full biochemistry
- Homocysteine
- MTHFR
- Full blood count
- Iron studies
- Cholesterol/ lipid studies
- Thyroid function
- Vitamin D
- Nitric oxide- cant do in Australia
- Prothrombin, factor 5 leiden and thrombophilia screen
- CBS function - depending on MTHFR presentation

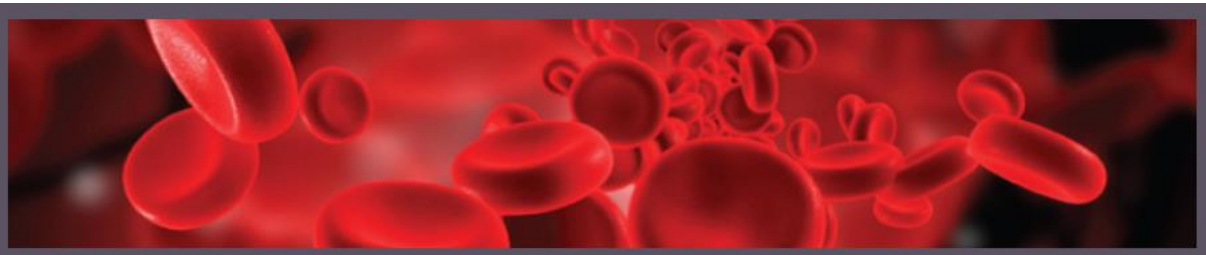
circ.ahajournals.org/content/116/15/1725
www.healthmasterslive.com/product/ben-lynch-mthfr-clinical-series-2014/



Important things to remember

- Side effects of methylfolate i.e. when are you over methylating:
  - Muscle pain, joint pain
  - Irritability, increased anxiety
  - Decrease in mood, even severe depression
  - Headaches, vomiting, nausea
  - Rash

DON’T SELF MEDICATE. GET PROFESSIONAL ADVICE IF YOU HAVE ISSUES



THANK YOU AND QUESTIONS

A final note

- We will be sending you a feedback questionnaire with our recording. Please give us feedback on this webinar as we want to ensure we are giving covering areas and issues of interest and relevance to you
- Every month we will be delivering a MTHFR specific webinar so if there is a topic you want us to address then please let us know

- **NEXT WEBINAR**
- **23rd September**
- **Is MTHFR making you fat?**

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