Heart Sugar and Stress - WAFIC, 2014

To cover:

1. Metabolic Syndrome: where we can intervene
2. Stress: What else is there?

Metabolic Syndrome: where can we intervene?

Key things to focus on:

1. What helps diabetes and blood sugar levels will also help with heart health.
2. Exercise and nutrition should be used in combination for best results.
3. Whole natural food dietary patterns, regardless of their name are beneficial for these conditions.

Metabolic Syndrome - Disease processes

Cardiovascular Disease

Heart, Sugar and Stress - The latest update
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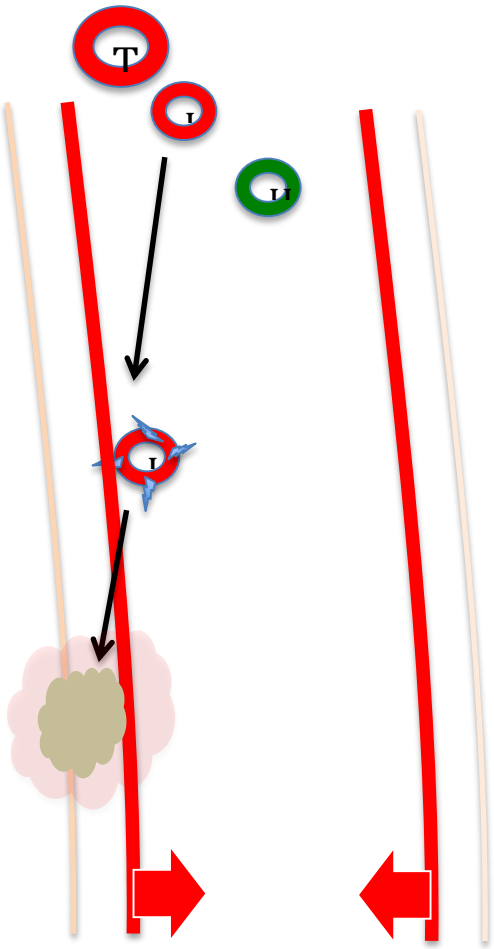
LDL cholesterol and Triglycerides oxidise in response to stress and exposure to free radicals (incl. AGEs). Oxidation makes them react to the wall of the artery, where they create an inflammatory response. This creates an accumulation of immune related proteins and more cholesterol and triglycerides.

High blood pressure is due to the vessels constricting/narrowing, which puts more tension on the vessels, making them more susceptible to the above process, and weaker as it progresses.

The inflammation pile up weakens the wall of the artery, and under pressure it busts open, creates a blood clot that then causes a blockage somewhere down the vessel.

HDL cholesterol can aid in taking some inflammation related build up away.

Any excess glucose in the blood creates AGEs and causes more inflammation.



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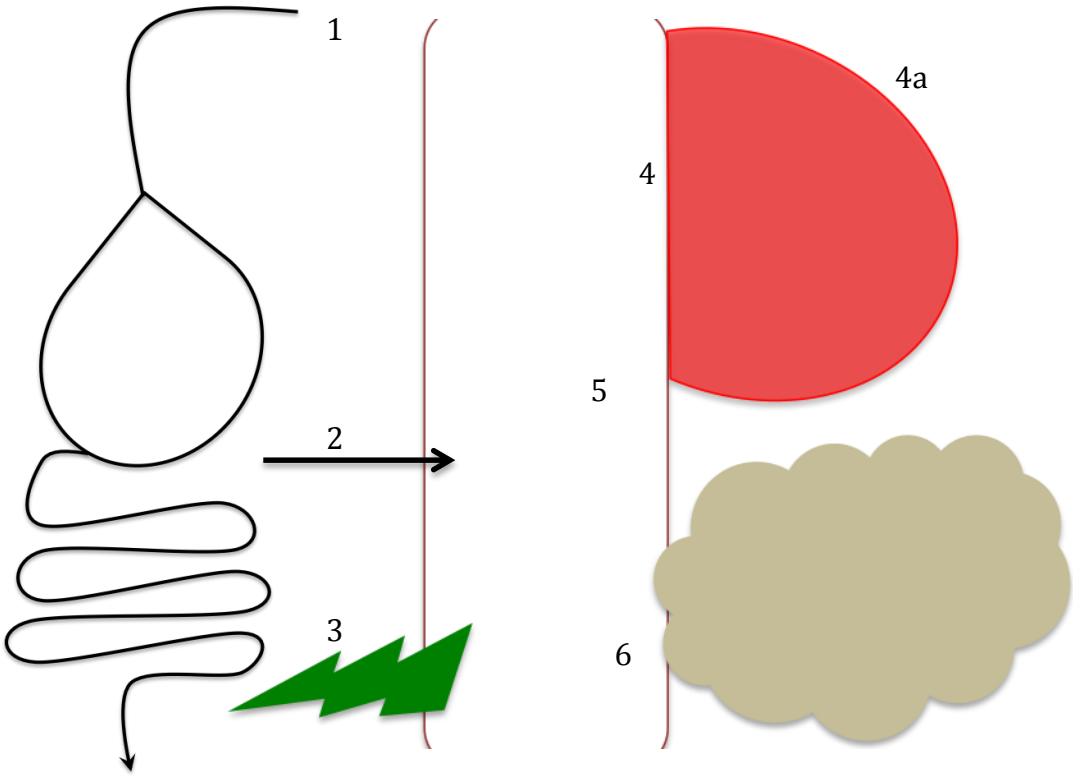
Blood Sugar Control



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1. Food is eaten (containing carbohydrates). 2. Glucose enters the blood from the gut. 3. The pancreas responds to an increase in blood sugar by releasing insulin. 4. The glucose's one job is to get into the muscle tissue and turn into usable fuel. 4a. Muscles can use glucose as a fuel.
5. Insulin resistance/stress/inactivity causes difficulty for the glucose to get in, or too much glucose is added at once. Extra insulin is produced to compensate. 3. The pancreas β-cells get overworked. 6. Extra insulin reduces the ability to burn fat, and increases it's deposits in and around the organs. Extra glucose in the artery causes additional stress and inflammation, which can increase the risk of CVD and

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Metabolic Syndrome - priorities and places to intervene

	Why
Waist Circumference	Visceral fat deposits increase inflammation, insulin resistance and increase cholesterol production.
Glucose control	High blood sugar levels increase the risk of CVD and are the main risk factor/symptom for diabetes
Inflammation & anti-oxidants	Inflammation affects glucose control, damage as a result of cholesterol oxidation, and worsens the response to either of these issues.
Cholesterol levels	Cholesterol, triglycerides not only provide a view into the function of the body generally, but are known to promote metabolic syndrome
Mediterranean and high fruit and vegetable intake	The combination of these foods have been shown to have a synergistic effect on cholesterol, triglycerides and overall metabolic syndrome risk
Refined and processed foods	These foods have their own increased risk of disease.
Exercise and Physical Activity	Has acute and long term effect on all elements of both diseases except for nutrient intake.

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Whole Dietary Patterns

The Mediterranean Diet Pattern

What does it do for Metabolic Syndrome?

- 30% reductions in CVD risk (without exercise) – compared to low fat diet
- Protective of developing metabolic syndrome
- Reductions waist circumference
- Increase in HDL
- Decreases Triglycerides
- Decreased Systolic and Diastolic blood pressure
- Decrease glucose levels

What are the main components?

1. >4tbsp Olive oil
2. >400g Vegetables (>200g raw)
3. 3 fruit
4. 450g Legumes/wk
5. 350g fish/wk
6. Choose white over red meat
7. 1 glass wine/day
8. Tomato based sauces (added herbs/spices/garlic)
9. *<100-150g processed/red meat/d*
10. *<12g/day of butter marg or cream*
11. *<3 pastries/cakes/ biscuits/wk*

The Mediterranean vs Paleo Diet

- 2 trials have shown comparable and beneficial results for both dietary patterns

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- Important similarities exist in the dietary patterns - high fruit intake, moderate protein intake (1g/kg BW), high intake of vegetables, nuts, berries.
- No long term trials exist proving the long term benefits of the paleo

What's the main story?

- High fruit and vegetables intake
- Remove refined and processed grains
- Healthy fat intake through olive oil and/or nuts
- Increase intake of fish, unprocessed meats

DO IT IN A SUSTAINABLE, PALATABLE WAY - IT NEEDS TO BE A LIFELONG VENTURE IF IT's GOING TO WORK!

Advanced Glycation End-products - What's AGEing your metabolism?

Increase intracellular oxidative stress
Increase stress and cell death of β-cells in the pancreas

How do they do it?
When sugars reduce (oxidise) they form AGEs (Carboxymethyllysine (CML), pentosidine, or derivatives of methylglyoxal (MG)

Created through heat, ionization, irradiation → 10% absorbed in

Heart,

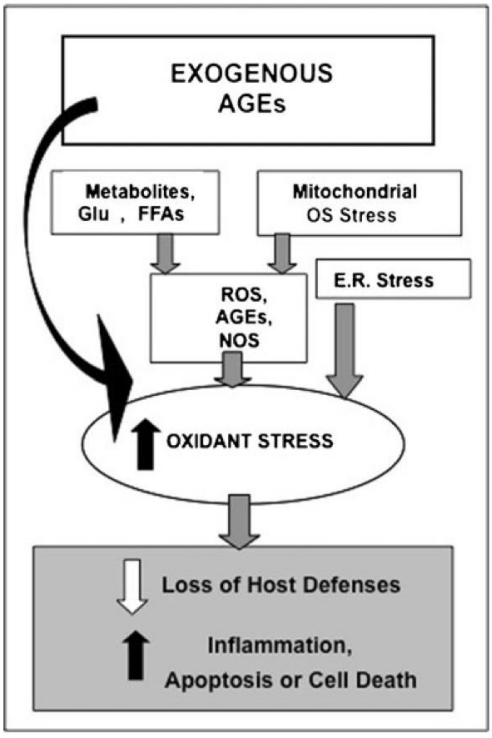

Fig. 1 Native and exogenous sources of oxidants, a most notable one being food derived AGEs, contribute to cellular and tissue injury in chronic diabetes

through digestion

- Stays in the body for 72 hours
- Increases formation of AGEs
- Increases inflammation on a systemic level

They can be blocked by anti-oxidants or anti-AGE agents.

Chronic exposure

- Eventual depletion of natural anti-oxidant systems

In practice…
15000kU/day is the median intake of AGE consumption in healthy pops.

- Reducing AGE formation and therefore consumption contributes to significant improvements in diabetes.
- A high AGE diet is acutely associated with poorer diabetes outcomes.

A great consideration for the advanced health conscious client!

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Heart Rate Variability

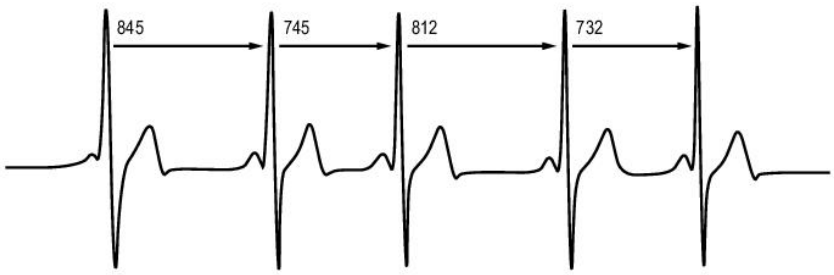
What is it?

The beat-to-beat variation of the heart rate.

i.e. Measures the variation of successive R-R intervals.

- Greater variation between beats is beneficial, while a lower variability indicates a poorer brain-heart interaction.

- A simple and non-invasive way of measuring interaction between the autonomic system and cardiovascular system.
- Linked to mindfulness and decreased stress levels (cognitive stress)



What are the major premises?

1. The internal pace maker of the heart in resting state is constantly under some degree of suppression by the parasympathetic nervous system.
2. An increase in environmental or cognitive stress results in a decrease in parasympathetic activity and more internal pacing of the heart, which has a low level of variability.
3. Spending your time in low HRV more of the time is detrimental for cardiovascular health and other diseases.

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4. Understanding how to elicit a high HRV is beneficial for memory, attention, focus, creative insight and emotional regulation
5. The ability to regulate these emotions is dependent on the brain's resilience.

Heart Rate Variability and Metabolic Syndrome

- Low HRV is present in early-stage diabetes, which worsens over time with the disease
- Lower HRV is seen in non-diabetic people with high fasting glucose levels.
- Lower HRV is associated with poorer cardiovascular outcomes.

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What can influence HRV?

Factors that influence HRV

- Genetics
- Environment
- Mindset
    - Depression is linked to lower HRV, and due to this is thought to be the link joining depression with CVD.
    - Mindfulness training and Yoga improve HRV
- Body weight/Obesity
    - Improving weight and fat loss increases HRV
- Diet
    - Mediterranean diet may be associated with better HRV
    - Fish oil supplements – particularly DHA-rich have a dose dependent influence on increased HRV
- Exercise
    - Aerobic and resistance exercise have been shown to improve HRV, not seen in all studies.
- Sleep
    - Disturbed sleep is more likely to have lower daytime HRV
        - Shiftworkers are known to have lower HRV than normal hours work.

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