

DIET, IMMUNITY & INFLAMMATION

Diets play a significant role in determining health outcomes. Many people already understand the connection between diet and weight management, diet and chronic disease development and, more recently, diet and mental health. But how does diet impact the immune system and the body's ability to fight infection and heal? Diet has a significant role to play post-polio and this is especially so in reducing chronic, systemic inflammation and managing the immune system. This presentation will offer an overview of these concepts and will provide simple and sustainable dietary changes.

THE STATISTICS:

- 63% of Australians are overweight or obese by BMI¹
- It is though this figure is closer to 80% when waist circumference is included
- Over 90% of Australian adults have at least one risk factor for CVD and 25 per cent have three or more risk factors²
- 10% of Australian adults has at least one marker of chronic kidney disease³
- 280 Australians develop diabetes each day (that's one every 5 minutes)⁴
- There are estimated 500,000 Australians living with undiagnosed diabetes⁴
- There are nearly 4,500 limb amputations in Australia each due to poorly managed diabetes⁴

THE STANDARD AUSTRALIAN DIET – SAD ☹:

- 35% of the caloric intake of Australians come from discretionary foods⁵
- Only 4% of Australian adults eat the recommended number of serve of vegetables daily⁶
- 10% of the total burden of disease in Australia was due to dietary risk factors¹
- The standard Australian diet is highly inflammatory which increases the risk of chronic diseases and reduces immunity
- Omega-6 to omega-3 fatty acids ratio is thought to be about between 8:1 and 16:1 but should be about 2:1⁷

WHAT IS INFLAMMATION and DOES IT REALLY MATTER?

- Inflammation is crucial to healing (in fact there are now questions about whether icing injuries actually makes things worse)
- Inflammation is crucial to fighting infections too

- There are two types of inflammation - acute and chronic
- **Acute localised inflammation** is the type we need to kick into action – there is a healing cascade that send white blood cells to the impacted area to fight the damage. We typically see swelling and redness, and may experience pain and heat.
- **Chronic systemic inflammation** is where we see long term inflammation that is misdirected...there may not be anything to actually fight but the immune system has gone into overdrive.
- People may not experience clear symptoms of chronic inflammation but rather the development other inflammatory diseases and conditions...or they may feel fatigued without reason.
- Inflammation underlies a number of disease states and conditions such as diabetes; cancer; cardiovascular, osteo-articular, and neurodegenerative diseases; autoimmunity disorders; and aging⁸
- **Diet** is a key factor in the development of inflammation and **stress** has a significant role to play too.
- Overweight and obesity also drive inflammation.
- Gut microbiome disruption impacts immunity too and this is also driven by diet, environmental toxins and lack of exercise¹⁰.

DOES INFLAMMATION IMPACT IMMUNITY?

- Inflammation change the way the immune cascade works.
- There are shifts in polymerase chain reactions (PCR) test results suggesting immune functions shift and changes to DNA. Inflammatory cytokines are evidenced in PCR tests⁹
- DNA determines how proteins are built - proteins act as antibodies in the immune system.
- Inflammation also causes alterations to hormone production and inflammatory markers⁹
- Inflammation can cause epigenetic changes to the immune syetm⁸

WHY DOES IT MATTER FOR POLIO SURVIVORS?

- Systemic inflammation is seen in polio survivors⁹
- Inflammation inhibits immunomodulaton⁸
- Considerations for inflammation in the brain⁹
- Development of comorbidities
- Hypothesis of polio virus residing long term in cerebrospinal fluid and the body's need to keep this in check.
- Inflammation in the central nervous system tells the body to produce greater levels of inflammatory markers such as tumour necrosis factor-a and cytokines.
- Adipose (fat) tissue secretes inflammatory adipokines.
- Inflammation may result in lower limb dysfunction⁹
- Exercise is anti-inflammatory but polio survivors may have limited capacity.
- Co-morbidities are inflammatory which continues the spiral.

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WHAT CAN YOU DO TO REDUCE INFLAMMATION AND IMPROVE IMMUNITY?

- Diet is one of the biggest factors in development of chronic systemic inflammation in the western world.
- Changing the diet is also very achievable for most people.
- Small sustainable steps are required – no requirement for an immediate major overhaul.
- You can still have fun!

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DIETARY CHANGES

Include

- Increase fruit and vegetable consumption
- Include some raw vegetables
- Decrease red meat consumption
- Switch to open range meats and grass-fed and grass finished meats
- Include oily fish - salmon, trout, ocean perch, sardines, mackerel
- Switch to free range or open range eggs
- Increase water consumption to 30ml per kg of body weight
- Switch to whole grain breads and pasta
- Full cream dairy - milk and yoghurt (unflavoured)
- Olive oil
- Small amounts of raw nuts and seeds
- Enhance flavour with herbs and spices
- Follow a Mediterranean diet
- Eat a rainbow every day the darker the colour of fruits and vegetables the better

Reduce

- Ditch soft drinks and cordials including diet drinks
- Reduce alcohol and coffee consumption
- Lollies, cakes, biscuits, hot chips, crisps
- Margarine
- Vegetable oil, canola oil
- Processed meats – salami, bacon, luncheon meat/devon, pastrami
- Roasted nuts and seeds
- Low fat dairy
- Salt

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KEY NUTRIENTS/FOODS

Vitamin C

- Antioxidant, anti-inflammatory
- Increases activity of T cells, phagocytes and natural killer cells
- Foods: rockmelon, strawberries, kiwi fruits, green leafy vegetables, ripe tomatoes, citrus fruits, red and yellow fruits and veg. Fresh is best for vitamins C

Vitamin D

- Antioxidant, anti-inflammatory
- Immune modulation - controls the activity of dendritic cells, lymphocytes and macrophages
- Foods: oily fish, egg yolks, full-fat dairy
- Get some sunlight

Zinc

- Antioxidant, anti-inflammatory
- Immune function – zinc is important in the innate immune system and is used in the production and management of various cells and cytokines in the immune cascade
- Hormone function
- Foods: shellfish, eggs, dairy, pepitas

Iron

- Antioxidant and detoxification actions
- Immune function – support lymphocytes and macrophage activity
- Foods:
Haem iron: meat, fish and poultry
Non-haem iron: eggs, dairy and green leafy vegetables, wholegrains, legumes

Probiotics

- Anti-inflammatory
- Immune function - suppresses pathogen growth
- Foods: yoghurt, kefir, buttermilk, sauerkraut, kimchi

Protein

- Provides amino acids to produce proteins required in the body
- Proteins act as antibodies for the immune system, enzymes, hormones and transport agents
- Food: meat, poultry fish, eggs, dairy, legumes, nuts, seeds, tofu, tempeh

Note that polio survivors require more protein than other people to help prevent sarcopaenia

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Recipes for Immunity

JUICE RECIPES

(recipes sourced from 'The Complete Book of Juicing' by Michael T Murray)

High C

½ cup broccoli florets
1 green capsicum, roughly chopped
1 red capsicum, roughly chopped
2 apples, cut into wedges
½ cup water or coconut water
Ice

Whizz together in Nutribullet or high-powered blender.
If using an older juicer, juice the broccoli then capsicum then apples.

Vegetables can contain very high level of vitamin C.

This juice contains:

- 3 serves of vegetables and 2 serves of fruit
- Calories - about 240
- Vitamin C - 296mg (about 6 times the RDI)

Immune Power Fruit Juice

1 orange
½ pineapple, sliced but leave skin on
½ cup strawberries
1 banana

Whizz together in Nutribullet or high-powered blender.
Add a little ice or water if you want it more liquid

This juice contains:

- 4.5 serves of fruit
- Calories - about 250
- Vitamin C - 58mg (25% more than the RDI)
- Bioflavonoids that act as antioxidants

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Immune Power Fruit Juice

2 cloves garlic
2.5cm slice of ginger
Handful parsley
4 carrots
1 apple

Whizz together in Nutribullet or high-powered blender.
Add a little ice or water if you want it more liquid

This juice contains:

- 4 serves of vegetables and 1 serves of fruit
- Calories - about 240
- Vitamin C - 51mg (25% more than the RDI)
- Bioflavonoids that act as antioxidants

Mel's Green Banana Smoothie

1 frozen banana
1 cup frozen pineapple
2 cups organic spinach
1 knob fresh ginger, peeled (about 2 inches of ginger)
A few sprigs of mint
½ tablespoon raw honey
½ - ¾ cup coconut water, almond milk or coconut milk (or other liquid of choice)

This juice contains:

2 serves of vegetables and 2-3 serves of fruit

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SOUP RECIPES

Roasted Pumpkin and Red Lentil Soup

2 tablespoons olive oil

1 brown onion chopped

1 red chilli ... seeds in

Small piece of ginger roughly chopped...skin on

2 cloves of garlic chopped

1 medium butternut pumpkin (I took the skin off but left the seeds in) - rustically chopped and roasted in an oven until soft

1/2 cup red lentils

1 litre organic vegetable stock

Pepper and Celtic sea salt to taste

In a large pot heat the oil and add the onion, garlic, ginger and chilli. Cook until onion is translucent. Then add the pumpkin, lentils and stock. Bring to the boil, then reduce heat and simmer until pumpkin and lentils are soft.

Whizz up in a high-powered blender.

Serve with a dollop of natural yoghurt, a sprinkle of pumpkin seeds and some dark rye bread.

This soup has plenty of immune boosting foods - onion, garlic, chilli, yoghurt, zinc in the seeds and vitamin C in the pumpkin.

If you don't have a high-powered blender this soup might be a little grainy.

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Garlicky White Bean & Kale Stew

Knob of coconut oil or good drizzle of olive oil
2 medium onions
6 cloves garlic
1 teaspoon smoked paprika (optional, but really delicious)
5 bay leaves
Pinch chilli flakes
Sea salt
Cracked black pepper
2- 2 ½ cups cooked white beans (lima, butter, navy, cannellini...)
2 cups packed shredded kale leaves
2 cups vegetable broth
1 can (14 oz.) organic whole tomatoes
Cold-pressed olive oil to garnish

Heat oil in a large stockpot. Slice onions and add to the pot with a couple pinches sea salt, chili, bay leaves and paprika. Cook for a few minutes until the onions have softened, then add sliced garlic. If the pot becomes dry, add a little juice from the tinned tomatoes.

Add all other ingredients, bring to a boil, season to taste, and serve with a drizzle of olive oil (since everything is cooked, you don't need to heat it long). If you are going to let it simmer for a while, add the kale about 5-10 minutes before serving so that it retains more of its nutritional value.

Recipe from: <http://mynewroots.org>

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SNACK AND SALAD RCEIPES

Energy Balls

10 medjool dates (pitted)
10 dried figs
1 cup oats
2/3 cup dry roasted almonds
2 tablespoons cacao powder
2 tablespoons tahini
1 tablespoon honey
1 tablespoon coconut oil (melted)
1 teaspoon vanilla extract
1/4 teaspoon cinnamon powder
Desiccated coconut for rolling.

Whizz all the ingredients (but not the desiccated coconut) in a food processor until reasonably fine and the mix can be rolled into balls.

Once rolled coat balls with desiccated coconut.

Makes about 20 balls.

Nut allergy? Use seeds instead of nuts.

Coeliac and sensitive to oats? Use quinoa flakes, rice flakes or buckwheat instead of oats.

Keep them in the fridge. And remember they really are energy dense so don't eat too many at once!

Rainbow Warrior Crunchy Salad (2 serves)

Ingredients

1 cup iceberg lettuce, shredded
1 carrot, grated
1 small beetroot, grated (raw)
Small handful of snow peas, thinly sliced
Small handful of raw green beans, chopped
¼ red capsicum thinly sliced
1 tablespoon shredded dried coconut
1 tablespoon goji berries or organic sultanas
1 tablespoon pepitas
A few mint leaves shredded
1 teaspoon extra virgin olive oil
Squeeze of fresh lemon juice or orange juice

Toss all the ingredients in a bowl.

Serving suggestions:

- Serve as a side with protein of choice – grilled fish, chicken, beef, tofu or with boiled eggs.
- Or serve with grated haloumi cheese through it or with grilled haloumi.
- Use as a filling for wraps or rice papers rolls

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