Pain, metaflammation and the anti-inflammatory lifestyle

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Human lifestyle activities can lead to an inflammatory burden which spills over into the experience of chronic pain[1]. Unsurprisingly, inflammation is crucial in the experience of chronic pain [1]. Inflammation, in which the immune system is strongly involved, functions to protect the human organism [2]. We all understand the swelling, redness and pain associated with inflammation after an injury or when we are ill or coming down with an infection. When the injury or infection goes away, the symptoms go away too. However, since the early 1990's researchers have been aware of a different type of inflammatory process characterised by low grade, systemic and chronic levels of inflammatory chemicals that are known to be associated with chronic metabolic diseases [3]. This type of inflammatory process is called "metaflammation". Professor Garry Egger, chair of Lifestyle Medicine at Southern Cross University notes that "the biggest distinction between pro- or anti-inflammatory inducers is a temporal one". Most of the anti-inflammatory agents are those that have been around for thousands of years as humans have evolved. Those that enhance metaflammation are relatively new, he says, and date from the time of the industrial revolution [4]. This article will identify features of an anti-inflammatory lifestyle which may be helpful in the management of chronic pain – among other chronic condition problems.

Diet

Reflecting on the Australian diet 50 years ago gives us cause to consider the dramatic change that has occurred. We eat more and differently, and on the whole are much heavier as individuals nationwide, in fact we are the largest in the world [5]. This rise in obesity signals changes that may be related to our increasing prevalence of chronic pain: whereas in 2007 one in five Australians were living with chronic pain [6], in 2010 that number had risen to one in three [7]. We inevitably ask the question: What is causing this increase and these changes? Current thinking about metaflammation may provide some insights into why pain is on the increase. Our immune system is designed to protect us and develops a response based on an evaluation of the threat value of anything we are exposed to,

[1] Chronic pain is pain that doesn't go away when the injury or illness has resolved, and is thought to be daily pain that lasts for longer than 3 or 6 months. It can also be associated with chronic disease or injury, eg arthritis, lupus, cancer or even ongoing infection post injury. Medically unexplained pain is particularly problematic, being pain that cannot be explained by an injury or illness.

including the foods we eat. According to Professor Egger, our immune systems are accustomed to foods that we have consumed for thousands of years. Foods recently added to the diet are problematic [3]. See Table 1 which is Professor Egger's summary of pro- and anti-inflammatory "inducers" in our Western lifestyle. A good example is the difference between kangaroo or game meat which has been a part of human diet for centuries, compared to Wagyu beef and other grain fed meats. Kangaroo and other wild meats are anti-inflammatory whereas domesticated beef and Wagyu are pro-inflammatory. When building an anti-inflammatory diet it is also useful to consider that foods rich in Omega-3 fatty acids are anti-inflammatory. See Table 2 for a list of Omega-3 foods.

Table 1: Foods influencing metaflammation

1. ANTI-INFLAMMATORY (OR NEUTRAL)		**2. PRO-INFLAMMATORY**	
Generic	**Specific**	**Category**	**Foods/drinks**
Alcohol (moderate)	Red wine; white wine; beer; non-alcoholic beer	Alcohol (excessive)	High total intake; Bingeing
Bulbs/roots	Garlic; ginger; onions		
Cocoa	Dark chocolate		
'Traditional' Dietary patterns	Low Omega-6:Omega-3 ratio; Mediterranean; polymeal; portfolio; vegan	'Modern' Dietary patterns	'Fast foods; High Omega-6:Omega3 ratio; 'Western' style; High GI Load; High fat diet; 'cafeteria' diet
Dressings/ condiments	Olive oil; vinegar		
Energy intake	Restricted	Energy intake	Acute; chronic high intake
Fats (mainly vegetable sources)	MUFA; some PUFA	Fats (mainly animal sources)	Saturated; trans fats
Fibre (high intake)	Fruits; vegetables; lignan	Glucose	High GI (mainly processed) foods;
Fruits	Greater variety (not quantity); apples; berries; bilberries; blueberries; camu camu (tropical fruit); cherries; cranberries; grapes; raisins; raspberries strawberries Pomegranate	Refined carbo-hydrates	
Fruit juices	Apple; blackcurrent; orange; pomegranate; red grape	Sweetened soft drinks	Sugar/fructose sweetened
Grains	Cereals; flaxeed flour; wholegrain		
Herbs/Spices	Cinnamon; cloves; curcumin; chillies; oregano; peppers; capsaicin; fennel; fenugreek; ginseng; rosemary; sesamin;		

	tumeric		
Game/wild Meats	Lean game meats; kangaroo	Farmed Meat	Domesticated beef; wagyu
Milk	Breast milk; wild animal; A2; soy		
Nuts & Seeds	Almonds; hazelnuts; macadamia; mixed nuts; pistachio; walnuts		
Seafood	Fish (salmon); Farmed fish-fed fish		
Soy	Beans; tofu; milk		
Supplements	Black raspberry extract; black current extract; fish oil; garlic powder; grape seed/skin/power extract; Omega 3; plant sterols; psyllium; strawberry extract; walnut extract	Starvation	Fasting
Tea	Green; black		
Vegetables	Legumes; tomatoes		
Veg. juices	Beetroot; carrot; tomato		

Table 2: Omega 3 foods

World's Healthiest Foods ranked as quality sources of Omega 3 fatty acids						
Food	**Serving size**	**Cals**	**Amount (g)**	**Daily Value(%)**	**Nutrient Density**	**Rating**
Flaxseed	2 Tbs	95.3	3.51	146.3	27.6	Excellent
Walnuts	0.25cup	163.5	2.27	94.6	10.4	Excellent
Salmon baked or grilled	2 tsp	9.2	0.12	87.1	6.0	Excellent
Cloves, dried, ground	2 tsp	14.2	0.20	8.3	10.6	Very good
Oregano, dried, ground	2 tsp	9.2	0.12	5	9.8	Very good
Sardines	3.25oz	191.4	1.36	56.7	5.3	Very good
Mustard seeds	2 tsp	35	0.20	8.3	4.3	Very good
Cabbage shredded or boiled	1 cup	33.0	0.17	7.1	3.9	Very good
Broccoli steamed	1 cup	43.7	1.20	8.3	3.4	Very good
Romaine lettuce	2 cups	15.7	0.08	3.3	3.8	Good
Brussel sprouts boiled	1 cup	60.8	0.26	10.8	3.2	Good
Tofu, raw	4 oz	86.2	0.36	15	3.1	Good
Spinach boiled	1 cup	41.4	0.15	6.3	2.7	Good
Soybeans cooked	1 cup	297.6	1.03	42.9	2.6	Good
Prawns steamed or boiled	4 oz	112.3	0.37	15.4	2.5	Good
Strawberries	1 cup	43.2	0.11	4.6	1.9	Good

Exercise

Research has found that regular exercise reduces inflammatory processes in the body [8]. It is tempting to extrapolate that more exercise is better than moderate exercise, however in many cases, people in pain find themselves "paying for it later" when they initiate an exercise regime that is over-zealous. The key is in starting with truly manageable steps, no matter how small, and slowly increasing so that the anti-inflammatory effects of moderate exercise can be experienced. Those that go too hard may find themselves then feeling that (yet again) a "pain management" strategy doesn't work. Repeated failures and feeling blamed for those failures can lead to feeling somewhat defeated [9]. The danger in experiencing perceptions of repeated failure is that it can contribute to depression which, like a catch 22, leads to further inflammatory problems.

Depression and responses to stress

Chronic stress is experienced by individuals when a difficult life situation continues without hope of abating. Good examples are caring for a chronically ill parent or child and for many people experiencing chronic pain, which is characterised by the deterioration of life roles, societal stigma and growing social isolation, constitute chronic stress. The health effects of chronic stress are significant, with one meta-analysis revealing that of all the life stresses chronic stress had highly deleterious effects on the immune system with resultant systemic inflammation [2]. Men appear to be at greater risk, with studies showing increases in inflammatory markers in men with high levels of hostility, anger and depression [10]. Here again, an anti-inflammatory approach has merit. Of particular usefulness for people in pain is considering mindfulness meditation which has good empirical research showing that it *decreases* inflammatory markers in the blood and promotes wellbeing [11].

Connection

A review of the importance of an anti-inflammatory lifestyle is not complete unless we take account of the important role of human relationship in protection from illness and particularly systemic inflammation. There is a large body of research which shows that the immune system can become activated when humans are socially stressed. For example, young mammals demonstrate increases in inflammatory markers when separated from their mothers [12, 13]. Another study found that a test of social rejection triggered increases in oral levels of two inflammatory markers. Positive social experiences, particularly involving fun and laughter have been shown to lower stress and

immune chemicals in the blood [14]. People in pain benefit from increased awareness of the importance of love, friends and family.

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