NUTRITIONAL INFLUENCES ON RHEUMATIC DISEASES

Daniel Lewis

Daniel Lewis Rheumatology Centre
73 Chapel St  St Kilda

www.daniellewiss.com.au
www.pathways2wellbeing.com.au
The Breadth of Rheumatic Diseases

Inflammation

Rheumatoid arthritis
SLE
Psoriatic arthritis
Ankylosing spondylitis
Scleroderma
Myositis
Polymyalgia rheumatica
Breadth of Rheumatic diseases

Inflammation
RA/ SLE/ psoriatic/ ankylosing spondylitis/ scleroderma/ myositis / PMR

Pain and CNS disorders

Fibromyalgia/
ME/CFS
Spinal pain
myofascial pain
Breadth of Rheumatic diseases

Inflammation
- RA/ SLE/ psoriatic/ ankylosing spondylitis/ scleroderma/ myositis / PMR
- Osteoarthritis
- Osteoporosis
- Tendonopathies

Pain and CNS disorders
- Fibromyalgia/ ME/CFS
- Spinal pain
- Myofascial pain

Cartilage and bone disorders
- Osteoarthritis
- Tendinopathies
- Osteoporosis
Nutrition and rheumatic diseases.

An essential aspect of Lifestyle Medicine

Foods: What to eat... What not to eat ... How to cook

Special diets

Allergy and food sensitivity, gut inflammation
Nutrition and rheumatic diseases

Gut permeability or “leaky gut syndrome”
Nutrition and rheumatic diseases

The Microbiom and Dysbiosis
Nutrition and rheumatic diseases

Macronutrients and Micronutrients
Supplements
Nutrition and rheumatic diseases

Constipation
IBS
Nutrition and rheumatic diseases

Neutrigenomics
Diagnostics
The Agenda
Nutrition - a component of Lifestyle medicine

www.pathways2wellbeing.com.au
Pathways to Wellbeing

Optimal Nutrition
Eating is an enjoyable experience
- I’LL TAKE ‘EM BOTH MATE. I’M DOING SOME WEIGHT TRAINING LIKE ME DOCTOR SUGGESTED ANYWAYS.
According to the WHO, 46% of global disease burden and 59% of global mortality are due to chronic diseases.
Chronic Disease

Most chronic diseases are interrelated.

Contain an element of increased inflammatory response.
The increase in ‘inflammatory tonus’ is mainly the result of **lifestyle and nutritional habits**, making the increase controllable.

Inflammation
Tsunami of Chronic Disease

Inflammation

Cellular damage

Telomere shortening

Accumulation of advanced glycation end (AGE) products.
Tsunami of Chronic Disease

Inflammation

Cellular damage

Telomere shortening

Accumulation of advanced glycation end (AGE) products.
Advanced Glycation End-Products. (AEGs)

Are proteins or lipids formed

**Exogenously** when sugars are cooked with proteins or fats at high temperature.

**Endogenously** by normal metabolism ageing.
Advanced Glycation End-Products. (AEGs)

Typically formed when sugars are cooked with proteins or fats at high temperature.

Accumulate over time.
Advanced Glycation End-Products. (AEGs)

AGEs are:

- Typically formed when sugars are cooked with proteins or fats.
- Accumulate over time.

Strongly associated with ageing, chronic diseases and other markers of inflammation.
Advanced Glycation End-Products (AGEs)

AGEs are:
- typically formed when sugars are cooked with proteins or fats.
- accumulate over time.
- strongly associated with ageing, chronic diseases and other markers of inflammation.

Binding of AGEs lead to subsequent expression of NF-[kappa]B-regulated cytokines.

AGE's generate free radicals.
**Advanced Glycation End-Products. (AEGs)**

AGEs are:

- Typically formed when sugars are cooked with proteins or fats.
- Accumulate over time.
- Strongly associated with ageing,
- Chronic diseases and other markers of inflammation.

**Endothelial damage**

Daniel Lewis
Rheumatology Centre
Advanced Glycation End-Products (AGEs)

Inhibited by

- Pyridoxamine 50 mg (B6)
- Benfotiamine 50ug (B12) twice daily
- Methylcobalamin 50 mg (B1)

Syngle A et al; Advanced glycation end product inhibition improves endothelial dysfunction in rheumatoid Int J Rheum 2012; 15:45-55
Foods: What to eat... What not to eat

What we eat and how we cook can have a profound effect on our health.
Foods: What to eat... What not to eat

What we eat and how we cook can have a profound effect on our health.

The majority in society are overfed but undernourished.
Foods: What to eat... What not to eat

"Let food be thy medicine and medicine be thy food".

Daniel Lewis
Rheumatology Centre
Foods: What to eat... What not to eat

Inverse relation to CRP
26% of patients are discharged from hospital with a lower nutritional status than they had prior to admission.

Soil Health

Soil health affects the mineral content of food.

?? soil health and genetic modifications
Soil Health

Soil health affects the mineral content of food.

?? soil health and genetic modifications

Be involved in the debate!
Research

Broadly speaking the research has been focused on four separate but related questions:

Is any diet helpful in inducing or maintaining remission? (eg. elemental or food allergy avoidance)

Is there a nutritional cause?

Can specific nutrient supplements aid in treatment?

What is the role of nutrition support?
Special Diets

Despite numerous studies over decades the evidence is still lacking power and is not well collated and presented.
Special Diets

Shatin R: Preliminary report for the treatment of rheumatoid arthritis with high protein gluten-free diet and supplements.

A vegan diet free of gluten improves the signs and symptoms of rheumatoid arthritis: the effects on arthritis correlate with a reduction in antibodies to food antigens.

Foods to avoid

**Prostaglandin E-2** has an inflammatory action it is derived from arachadonic acid

**Meats** (the average omnivore ingests between 200-1,000 milligrams of arachadonic acid each day)

**Linoleic acid**, which comes from cooking oils, particularly corn, sunflower, safflower, and cottonseed

Elimination Diet

The Elimination diet is based on the foods least likely to cause problems such as:

- sweet potatoes
- brown rice
- non citrus fruits
- green and yellow vegetables
- Water as beverage

All thoroughly cooked

If improvement is found (usually within 1 to 2 weeks), then foods are added back one at a time to see if there is an adverse reaction.

Special Diets

Common thread with variations

Whole starches, vegetable, and fruits.
No gluten
No meat
No dairy
Alkaline
Special Diets

Common thread with variations

Whole starches, vegetable, and fruits.
No gluten
No meat
No dairy
Alkaline
Special Diets

The Alkaline Diet: Is there evidence that an alkaline pH diet benefits health?

Special Diets

Acidosis and high sodium results in osteoporosis, loss of muscle mass.

Alkaline diet increases intracellular mg-reduces HT and stroke.

Alkaline diet and Vit D improved chronic low back and pain.

There is almost no data on inflammation, or any specific rheumatic disorder.

The Alkaline Diet: Is there evidence that an alkaline Ph diet benefits health?

Alkaline Mineral Supplementation decreases pain in Rheumatoid Arthritis patients: a Pilot Study The Open Nutrition Journal 2008 2 100-105
Special Diets- Fasting

Fasting is a high risk, short term treatment.

Only a limited number of studies have shown fasting to transiently reduce joint pain in RA.

No studies have shown persistence of improvement for greater than ten days.

Fasting followed by Vegan diet improved symptoms over 12 months.


Special Diet- My Experience

10 patients with active stable RA on DMARDs and put them on a 3 month elimination diet

<table>
<thead>
<tr>
<th>12 Weeks</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>ACR</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>No Change</td>
</tr>
</tbody>
</table>

Many isolated examples.
Eat an anti-inflammatory diet

- Eat 6 vegetable and 4 fruits (relatively uncooked) per day.
- Reduce refined carbohydrates and high GI foods
- Increase complex carbohydrates and fibre
- Reduce saturated fat, reduce inflammatory omega 6 fats and eliminate trans fats.
- Increase omega 3 (fish & supplements)
- Increase omega 9 (Oil and nuts)
Eat an anti-inflammatory diet

- Eat 6 vegetable and 4 fruits (relatively uncooked) per day.
- Reduce refined carbohydrates and high GI foods
- Increase complex carbohydrates and fibre
- Reduce saturated fat, reduce inflammatory omega 6 fats and eliminate trans fats.
- Increase omega 3 (fish & supplements)
- Increase omega 9 (Oil and nuts)
Inflammation - Is there a nutritional cause?

It is likely that 3 factors must be present simultaneously

- Environmental trigger
- Genetic susceptibility
- Intestinal hyper permeability

Leaky Gut Syndrome - Intestinal permeability

Leaky gut or intestinal permeability refers to a loss of integrity in the cell wall whereby bacteria, allergens and incompletely digested proteins can enter the systemic circulation resulting in immunological response.

Tight junction dysfunction is mediated by a protein called zonulin or haptoglobin 2 precursor.

Zonulin and Its Regulation of Intestinal Barrier Function: The Biological Door to Inflammation, Autoimmunity, and Cancer
Fasano A; Physiol Rev 2011 Jan;91(1):151-75
Leaky Gut Syndrome - Intestinal permeability

Leaky gut

↓

Inflammation

↓

allergic, inflammatory, autoimmune diseases.

When the zonulin pathway is deregulated in genetically susceptible individuals, autoimmune disorders can occur.

Fasano A; Clin Rev Allergy Immunol. 2012 Feb;42(1):71-8
Leaky Gut Syndrome - Intestinal permeability

There are a range of nutritional protocols to reverse this process.

No definite data in clinical trials.

Figure 1. Intestinal mucosal nutrient absorption pathways

Van der Hulst Glutamine and the preservation of gut integrity Lancet 8857;1 1993 1363-1365
Gut Dysbiosis and Inflammation

There are roughly 4000 bacterial species in the intestine where they help
- digest nutrients
- produce vitamins
- anti-inflammatory compounds

Ref: Human Microbiome Project Consortium
Gut, Dysbiosis and Inflammation

Microbial cells out number human cells 10:1

The genes in these microbes number millions compared with 23000 genes in the human genome.

Patients with autoimmune and inflammatory conditions have a microbial profile that differs substantially from healthy subjects.

The evidence for causality is lacking and disease is likely to be poly microbial in nature.
Gut, Dysbiosis and Inflammation

Stress can induce changes in the gut.

Nutrition influences the gut microbiome

Symbiosis leads to regulation and homeostasis.

Dysbiosis can lead to inability to fight infection.
GIT Subclinical inflammation

RA - Perpetuates the systemic inflammatory processes

Ank Spond - Induces IL 23 in the enthesis driving inflammation

FM ME/CFS - circulating cytokines explain many of the symptoms

Hamer et al. Cell; 1990 63 1099
Leaky Gut Syndrome - Intestinal permeability

There are a range of nutritional protocols to reverse this process.

No definite data in clinical trials

Watch this space closely!
Nutritional Influences on Rheumatic Diseases

How do you make sense of all these nutrition messages?
What do I do?
Nutritional Assessment

3 day food and drink diary

Medication including supplements

Symptom questionnaire

Evaluation of body weight (casual)

Self esteem and internal locus of control (compliance)
UNDERSTANDING

creating health
Nutrition - a component of Lifestyle medicine

Wellbeing Library

Facebook

Healtheletter

Personal Health record

www.pathways2wellbeing.com.au
SKILLS

How to observe symptoms and make adjustments to diet

How to shop

How to cook

How to eat

Manage supplements

An ongoing conversation.
Rheumatoid Arthritis - what do I do.

- Inflammation
- Food sensitivities
- Leaky gut

Associated Diseases

- Anti Inflammatory Diet
- Alkaline Diet
- Supplements
Rheumatoid Arthritis - what do I do.

Inflammation

medical emergency!

We have only 6 months to prevent disability.
Rheumatoid Arthritis - what do I do.

Inflammation

Food sensitivities

Associated diseases

infection
Food Sensitivity

Many studies have shown that, if testing is done with sufficient care, dietary sensitivities can be identified in 20-60% of subjects with RA.


Food Sensitivity

Many studies have shown that, if testing is done with sufficient care, dietary sensitivities can be identified in 20-60% of subjects with RA.

Elimination diet?
Rheumatoid Arthritis - what do I do.

Inflammation
Food sensitivities

**Leaky gut**

Associated Diseases

Anti Inflammatory Diet
Alkaline Diet
Supplements
Rheumatoid Arthritis - what do I do.

Inflammation
Food sensitivities
Leaky gut

**Associated Diseases**

Anti Inflammatory Diet
Alkaline Diet
Supplements
Rheumatoid Arthritis - what do I do.

Associated Diseases

osteoporosis
cardiovascular risk
infection
osteoarthritis
Rheumatoid Arthritis: what do I do.

Inflammation
Food sensitivities
Leaky gut
Associated Diseases

Anti Inflammatory Diet

Alkaline Diet
Supplements
Rheumatoid Arthritis - what do I do.

Inflammation
Food sensitivities
Leaky gut
Associated Diseases

Anti Inflammatory Diet
Alkaline Diet

Supplements
Rheumatoid Arthritis

Abundant research in RA
Omega 3

Krill Oil

Antarctic Krill (*Ephiausia Superba*)
Novel marine phospholipid carriers of EPA & DHA
and potent antioxidant, Astaxanthin.
Astaxanthin inhibits the production of
pro inflammatory prostanoids (PGE2) and TNF

Is the most abundant biomass on Earth.
Omega 3

Krill Oil

90 patients with CVD/RA/OA and elevated CRP. 300mg/day

30.9% in CRP at one month ($p < 0.001$).

Pain and WOMC

Omega 6: Borage oil

A quarter-teaspoon supplies 300 milligrams of GLA.

It can take several weeks for these oils to work, and up to six months to see their full effect.

The spice ginger has been used in **Indian ayurvedic medicine** for centuries as an arthritis treatment.

In vitro and In vivo studies show that it does indeed have anti-inflammatory effects.

An anti-inflammatory effect persisted for several days.

**Dose.** 1/2-1 teaspoon (1-2 grams) of powdered ginger each day. 4 to 12 weeks for benefits to appear.

Herbs: Tumeric

Curcumin is a component of the spice turmeric.

COX-2 inhibition
Anti tumour
Anti oxidant

Chopra., et al., Randommised double blind trial of Ayurvedic olant derived formulation for the treatment of rheumatoid arthritis. J Rheum 2000;27 1365-72
Funk, et al., Tumeric extraxts containing curcuminoids prevent experimental rheumatoid arthritis.2006; j Nat Prod 69(3) 351-5
Osteoarthritis

Inflammation
Cartilage loss
Obesity
Osteoarthritis

- Inflammation
- Cartilage loss
- Obesity
Osteoarthritis

Cartilage loss

Glucosamine & Chondroitin-
Inconsistent results.
More evidence for CS

Lukas MW. Condroitin sulphate reduced both cartilage volume and bone marrow lesions in knee osteoarthritis patients starting as early as 6 months after initiation of therapy: a randomised, double blind placebo-controlled pilot study using MRI. Ann Rheum Dis 2011 70(6) 982-989.
Osteoarthritis

Pain and Inflammation
Herbs: Tumeric

Curcumin is a component of the spice turmeric.
- COX-2 inhibition
- Anti tumour
- Anti oxidant


A double-blind, randomised, placebo controlled trial of the analgesic properties of curcumin (Nalgesic® Active Ingredient Cumerone 1200®) in osteoarthritis of the hand.

Daniel Lewis
Rheumatology Centre
Tumeric:
A double-blind, randomised, placebo controlled trial of Nalgesic.

Pain Associated with Gripping

Range of Movement
Osteoarthritis

Obesity

Obesity is an inflammatory disorder

Is an factor in progressive disease independent of the weight bearing effects.

How far have we gone?
Summary

Nutrition a dominant part of lifestyle medicine

What to eat... What not to eat

Special diets

Allergy and food sensitivity dysbiosis leaky gut

Nutrigenomics

Supplements
Summary Continued

Nutrition for:
Inflammation
OA

- Gout
- Cardiovascular risks
- Fibromyalgia
- Osteoporosis
- Obesity
THANK YOU

daniel.lewis@daniellewis.com.au