Nutrition and Immunity

Food and supplement strategies to maximize health and wellness

Matt Lovell
Good morning. I am here today to talk about nutrition and immunity and specifically about nutrition and supplementation strategies that you can use to improve your immune system.

I am trained as a clinical nutritionist and what that means is that I am trained to look at clinical signs and symptoms for imbalances in the body, potentially test for any clinical imbalances in the body and then instigate the protocols for change so that you correct the imbalances and make people feel, healthier, happier and wherein they perform better.

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- Antioxidants
- Inflammation
- Stress
- Adaptation
- Attitude
- Adaptogens
- Pre RWC protocols
- General Protocols;
- Assessment
- Movement
- Food
- Supplements
Now the functional medicine model of health you can see that immunity is one part of a very complex set of systems and immune function is integral to human function, without it obviously we die and often if another system breaks down in the body then it will have a knock on effect on immunity. So when we support the immune function what we are doing is we are protecting the body from becoming ill but also in doing so we are protecting the body from getting any diseases and increasing the potential to recover faster.
BACK TO BASICS

Golden Rules to be Practiced 80-90% of the time and never forgotten:

1. Drink enough water / green tea / hydration drinks, never get thirsty!
2. Eat Frequently, eat every 2-3 hours no matter what, unless you are sleeping
3. Eat Protein every time you eat
4. Eat vegetables or fruit every time you eat but eat more veggies than fruit
5. Eat starchy carbs every time you eat but eat more around time of the day when you are more active (breakfast and lunch) and less or none when you are less active
6. Recover aggressively and appropriately after every session
7. Eat whole-foods, low GI all the time except post-training when high GI foods are better for speedy recovery
8. Eat fat, but eat the right kind of fat – from oily fish, nuts and seeds, olive oil and omega eggs
9. Avoid ‘empty’ foods which contain calories but no goodness; doughnuts are a good example of these types of food
10. Remember to enjoy your foods and practice the 80:20 rule or 90:10; this means of 42 weekly meals and snacks, 4 can be whatever you want if you are being strict 90% of the time and 8 can be naughty if you are being strict 80% of the time
The immune system is also required for proper muscle function, muscle recovery, muscle function. So by supporting the immune system you are going to really support muscle recovery, muscle function. These are the areas I am going to cover and hopefully I am going to give you some practical ideas you can take home today to start to improve your own immune system and the immune systems of your athletes that you look after.

Immunity Overview

- What is immunity and how does it work?
- How training, stress and recovery influence immunity
- Negative Factors which hinder the immune system
- Positive actions and nutritional strategies you can employ to support your immune system

Understanding immunity is the key to using specific choices to improve our own immune support. You will know that someone has a dysfunctional immune system. They will be ill at the moment or they have had a history of being ill or they have a history of chronic infection like athlete’s foot, fungal nail infections, fungal skin infections like the little fungus which eats pigments of the skin which you see a lot of athletes have.

They could have chronic viral infections like herpes, warts basically as a physio amongst you would recognize people with dysfunctional immune systems because these will be the slow healers and also athletes that have unexplained fatigue.
We absolutely are surrounded by pathogens, viruses’ nasties like that.

I have forgotten who it was who said if feces were fluorescent the whole world would glow. There are literally germs absolutely everywhere, waiting to invade the body and make us ill. Now fortunately we have a very complex immune system and it is composed of organ tissue and specific and nonspecific immune or sometimes called innate and cell mediated immunity.
### Immune Anatomy

#### Organ Tissues
- Skin
- Thymus gland
- Bone Marrow
- Spleen
- Lymph Nodes
- Tonsils
- Adenoids
- Peyers Patches
- Appendix
- Liver

#### Non Specific
- Skin
- Mucous membranes
- Mucous secretions
- Stomach acid
- Lysozymes in tears / saliva
- Cilia
- Neutrophils
- Lysozymes
- Iron binding protein
- Other chemical mediators

#### Antigen Specific
- B Cells
- Antibodies
- Macrophages
- T Cells
- T Helper Cells
- T Suppressor cells
- Natural Killer Cells
- Complement system
- Interferon

### Stages of Immune Defence

- Natural and Acquired Immunity
- Mucous membranes
- Salivary IGA & hydration
- Innate immunity
- Terrain vs Germs
- Immune system
- Fungus
If we support any of the organ tissues involved in the immune function we will support general immunity. What is also important to understand is the process of inflammation in the body and we need inflammation in order to begin an immune response and it’s a necessary part of human health. Acute inflammation acts as an immune stimulate but chronic even low level inflammation is a root cause of many diseases and sub optimum immune function. So moderating the inflammation will be the key areas we will look at today.

In terms of things which can suppress immunity, here is a sort of a diagram

**Immune Suppressors**

Bacteria, viruses, fungi

Mucus with slgA

Mucous membrane

Antigens leak — Damaged — Pathogens — invade — Tissues injured

Sensitize

of the immune system functioning to prevent pathogens both from invading and then expel those pathogens and also deficiencies and areas and don’t worry I have got a bigger list which is easier to read and a couple of slides. Deficiencies in any of these areas will reduce the effectiveness of certain parts of the immune system.

Now the body’s first line of defense is the mucous membrane and the mucous itself. Mucous is a very complex fluid. It’s got a there is a layer of water which is insoluble and in the liquid there is something called secretory IgA which is an immunoglobulin, there are antibodies, macrophages, there is gut flora, the normal gut flora which is there in the intestines it’s also there in the mucous and the collective name for all the bits and bobs which are there in the
mucous is called the mucosal associated lymphoid tissue but you have also got the gastrointestinal associated lymphoid tissue and some nasal, bronchial, urogenital.

Basically this is known as the gut and the gut is the number one factor that you need to consider when you are supporting immunity of yourselves and your athletes. It is no wonder that over 80 percent of the immune cells are actually housed in the gut. Now if you are not healthy in the gut, there is no way you can have a healthy body.

**GUT HEALTH**

- MALT, GALT, NALT, BALT, UGALT
- The outside world, inside our bodies
- 90% of immunoglobulins directed at antigens in the gut
- Gut is No.1 source of chronic inflammation
- 80% of immune cells are housed in the gut
- 1st message;
- No health in gut, no health in body

And how do you know you are healthy in the gut, well one way to know if you are not healthy in the gut is if you have ever had food poisoning, have ever taken antibiotics and not replenished with probiotics afterwards, have ever had chronic diarrhea or have had a history of poor dietary habits all of which will directly affect gut health. What you see here is all the factors involved in sub optimum immunity. Now we are not going to go through these but you need to consider these when you want to improve the immune systems of your athletes.
Factors Involved in Immunity

- Nutritional Status
- Deficiencies; B, A, C, Zn, Cu
- Sugar and refined carb intake
- Food allergy
- Obesity
- Alcohol to intoxication
- Heavy metal – HMA
- Pesticides
- Stress
- Excessive exercise
- Inadequate rest

- Frequent exposure to infection
- Poor bowel flora
- Excessive fish oil consumption
- Air pollution
- Vaccinations
- Adrenal fatigue
- Trauma
- Chronic antibiotic use
- Hormone imbalance

A couple I want to talk about today is sugar intake specifically refined carbohydrate intake. Just about 100 grams of fine carbs or sugar will suppress the immune system for three to four hours, will suppress the neutrophil activities.
NUTRITIONAL INFLUENCES

- Higher tissue turnover
- Higher requirement for nutrients
- Modern food is low in essential nutrients

- Eat organic where possible
- Avoid anti-nutrients
- Avoid empty calories

Anti-Nutrients and Empty Calories

- All refined foods
- Sugar (except post training)
- Excess Caffeine
- Alcohol
- Cakes, biscuits and pastries
- Crisps and confectionary

- Soda Pop
- Refined Wheat
- Chips
- Fast and junk foods
- Snack a jacks
- Doughnuts
- Breakfast cereals
- All chemically assisted foods

Those are the ones that will engulf the pathogens. And when we see athletes, general public there are three things which are always wrong with them. They are always deficient in magnesium.
They always have imbalances in essential fatty acids and they always have imbalances in the bowel flora. So you can see these three things which have a direct reflect on their immune function.
Serotonin and Immunity

- SAD increases depression and lower immunity
- Vitamin D increases serotonin and testosterone production
- Reference ranges have changed; Am J Clin Nutr. 2006;84:18-28; 35 – 55nmol/l has changed to 90-100 nmol/l; 115-128 nmol/l
- Imbalance in bowel flora causes depression and fatigue
- Cytokine sickness syndrome – Dr Nigel Plummer
- All bacteria, viruses, toxins, allergens end up in the gut
- Gut health, light, mood and happiness all affect immune function directly
Inflammation

- Chronic inflammation inhibits immune function
- Omega 3 fatty acid imbalance is pandemic
- 100% of squad had imbalance in omega 3 / 6
- Despite supplementation for 2 years +

- Red cell fatty acid status is a key functional test for athletes
- Many factors are involved in fatty acid metabolism
- Stress, digestion and detoxification are normally culprits

The correction and selection of fats also has a number of other performance benefits.

Supporting testosterone, replacing intra muscular triglycerides, promoting the loss of body fats, so we actually give additional fats so people metabolize their body fat, improving increased sensitivity.
Correct Selection of Fats

- Promotes lipid peroxidation
- Replenishes muscle triglycerides
- Enhances immune function
- Improves hormonal environment – T levels
- **Improves insulin sensitivity** *(Luo J Nutr 1996; 126: 1951-8)*

And the types of fats we are looking for are the fats from deep sea fish. These are the fish, carnivorous fish with teeth and they feed on small fish which in turn feeds on crustaceans and some feed on plankton and that’s actually some of the essential fats that comes from the plankton
So what the plankton are able to do is combine sunlight inorganic minerals from the sea, carbon dioxide a great protein from fats and some good fats and some carbs so that these little guys are the ones that manufacture these special fats. Now some of the more modern fish omega 3 supplements are actually based in these plankton are actually plankton based and they actually go to the source.

You can get them from vegetarian sources too but they are generally not as effective because of higher up the enzyme chain. And you have to convert them more times before they become active chemicals in the body.

Now the reason we get out of whack is because of our modern eating habits. Paleolithic diet was sort of one to one omega 3 to 6 and the ratio we are looking for is one and a half to three omega 6 to three. Okay as a routine check we measured 32 players red blood cell fatty acids, we took their fats in august. None of them were in that range.
Ratio n-6 : n-3

- Total dietary fat intake 90g example;
  - 30g sats, 30g Monos, 30g Polys of which 25g n-6, 5g n-3 = 5:1 ratio
  - The addition of 3 tablespoons flaxseed takes Polys up to 75g of which 40g n-6 and 35g n-3 = 1:1 ratio

Also none of them had adequate GLA – you always need GLA if you are taking fish oil.

Now it’s not that difficult to eat that range but whether it gets built into the cell will depend on how fast these fat are being used for making anti-inflammatory hormones in the body.

Other types of fats you need to be aware of in terms of immune system really would be trans fats and these are any kinds of omega 6 fats which has been heated to a high temperature plus processed fats such as margarines. I shall come to it in a minute.
Good fats for immune function are coconut oil. Now coconut oil is 50 percent lauric acid and it becomes lauric acid becomes monolaurin in the body. Monolaurin has specific antibacterial properties and antifungal as well. Fifty percent of mother’s milk but the colostrums again are made up of lauric acid so it’s a very important fat for us but can help with the new born baby.

So the integral part of any performance based diet is that we are not totally against saturated fats. Best off avoiding omega 6. Saturated fats may have other benefits and it is an important part of the cellular membrane structure. It may have additional benefits for testosterone production.
Testosterone and Timing of Fat Intake

- Additional fat from animal protein may enhance testosterone production if taken after exercise.

- Mechanism may be reduced SHBG levels (Reed, M., et al 1987)

- Or increase cholesterol combined with LH drive for T production.

Whilst on the subject of inflammation of course we can’t forget allergenic foods because these will directly increase the inflammatory response. Common allergens most commonly confused wheat and dairy.
Allergenic Foods

- Opioids in wheat and dairy block enzymes in inflammatory cascade
- They can also slow the brain down
- Excess wheat and refined wheat suppresses immunity
- Excess dairy causes excess mucous production
- If you are constantly ill then food intolerance can be a cause

Opoids in wheat and dairy block the key enzymes in the inflammatory cascade specifically something called cyclooxygenase which converts fats into prostaglandins which are the active hormones which have the anti inflammatory effect or pro allogenic effect in the body.

These opioids also slow the brain down okay they know from studies with autistic children that they can slow the brain down.

And obviously dairy would be something that you would want to avoid in any way because both wheat and dairy enhance mucous production. And excess mucous is one of the things which makes you feel so debilitated when you are suffering from colds or flu or any kind of upper respiratory tract infection.
If someone is constantly ill again dysfunctional immune, you have got to look at food intolerance. This is one of my pet hates. Polyunsaturated fats are healthy if they are omega 3. Omega 6 should be avoided. All vegetable oils, all margarines should be avoided and you should actively increase omega 3, omega 9 maintain intake of saturated fat. Omega 6 would take care of itself.
Key Point

- Avoid all sources of omega 6
- Polyunsaturated health claims on labels are bullshit.
- e.g. All Margarine
- VEGETABLE OIL
- Increase all sources of omega
- Supplements, fish, walnuts, pumpkin and linseeds

EXERCISE

What about what happens when we exercise. When we exercise we deplete many systems and all of these depletion in these systems combined with nutrient depletion which occurs during exercise can suppress immunity.
Physiological and Metabolic Changes During Intense Exercise

<table>
<thead>
<tr>
<th>Description</th>
<th>Change</th>
<th>Description</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATP levels</td>
<td>Depleted</td>
<td>Muscle damage</td>
<td>Increased</td>
</tr>
<tr>
<td>Muscle glycogen</td>
<td>Partially depleted</td>
<td>Immune system</td>
<td>Suppressed</td>
</tr>
<tr>
<td>Cortisol levels</td>
<td>Increased</td>
<td>Inflammation</td>
<td>Increased</td>
</tr>
<tr>
<td>Protein degradation</td>
<td>Increased</td>
<td>Fluid loss</td>
<td>Increased</td>
</tr>
</tbody>
</table>

In addition the harder that we exercise the more that we will suppress our immune system with immune system suppression being highest after very high intensity exercise. This may be in part due to excessive release of cortisol which is an important part of the immune response. But too much can be detrimental to immunity.
TRAIN HARD

- Recover Harder

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Training Cycle

- Super Compensation theory of training

- Balance training with recovery – don’t go over drawn

- Nutritional Recovery is key to enhancing the immune response
So we need to be very aggressive and clever with our recovery protocols if we can support the immune system properly. Recovery drinks are an incredibly important part of immune support and increasing adaptation following exercise and the ingredients of course are vitally important.

This brings me to the second most important factor in immunity which is the increasing use of bioactive proteins in your diet in your recovery protocols. One of which is whey protein which is not the most common, the most common is yogurt. The most commonly consumed bioactive protein is yogurt. It helps with yeast infections and things like that. And also with gut health.

**Bio Active Protein**

- Contains *immunoglobulins (antibodies)*
- Yoghurt, Whey, colostrum, purified serum
- Enzymes; bromelain
- By pass digestive process
- Form of passive immunisation

But whey protein is very high in cysteine which builds something called glutathione which is a major anti oxidant defense mechanism in the body. It is also very high in lacta albumin which has a direct immune boosting effect on B and T lymphocytes. It is high on lactoferrin.

Lactoferrin is something which white blood cells produce and has a specific anti bacterial, antiviral and immune boosting properties. It’s also the subject of a couple of major studies in cancer and accelerating wound healing.
ACTION

- Recover Aggressively and appropriately after each exercise session

- Use Antioxidants as part of your recovery strategy when you feel you may be immune compromised

The type of whey protein is important because it's only this type which is ultra filtered at cold temperatures which retains all the bioactive components. Lactoferrin occurs in mother’s milk which is another bioactive protein and you get for about one gram of Lactoferrin for every a liter of mother’s milk that you consume.

We are still looking for a natural source of mother’s milk that we can tap into but of course we have got the cows and bovine colostrums that we can use for that kind of thing.
Adequate Protein

- Frequently protein is ignored at the expense of carbohydrate
- Protein builds the immune system
- Glutamine is one of the major fuels to the immune cells – it also protects your digestive tract

So we need to pay particular attention to recovering properly and immediately after each session and grade the recovery according to the intensity and duration of the session.
## RECOVERY MATRIX

<table>
<thead>
<tr>
<th>TRAINING INTENSITY</th>
<th>Immediately</th>
<th>Within 1-2 hours</th>
<th>Within 3-4 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LOW</strong></td>
<td>1 scoop of recovery powder in 300mls water</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MEDIUM</strong></td>
<td>2 scoops of recovery powder in 350ml of water</td>
<td>A Medium sweet potato with lunch in addition to routinely consumed foods</td>
<td></td>
</tr>
<tr>
<td><strong>HIGH</strong></td>
<td>3 Scoops of recovery powder in 400ml of water</td>
<td>A banana and bowlful of blueberries and yoghurt in addition to.....</td>
<td>A large slice of date and walnut cake with fruit smoothie</td>
</tr>
</tbody>
</table>

What we also need to do in terms of moderating the inflammatory response is to include as many anti-oxidants in the mix as we can.

Now the body will produce antioxidants and cortisol to lower the inflammatory response but we can support these systems in the body by including additional antioxidant protection. Antioxidants are measured by their power by something called the ORAC Scale okay it’s the potential to quench the free radical damage.
**ACTION**

- Eat vegetables or fruit each time you eat
- Choose veggies or fruit which are high in ORAC units
- Choose organic whenever possible
- When its not possible then wash all veggies and fruit thoroughly – then go and buy some organic ones

If you end up counting things you can actually look at these ORAC units and on particular recovery days you can recommend it to someone who consumes 10,000 ORAC units or 1000 ORAC units per ten kilos of body weight or something if you want it to be specific. And it’s a good way of getting players to buy into it and also encourage them to understand some of the concepts behind the recommendations.
Antioxidant Protection

Now a good thing about a number of these antioxidants is that they grow naturally and they taste great. And they come under the umbrella name polyphenols.
Anti-oxidants

- Curcuma longa (curry)
- Gingko biloba
- Blueberries
- Pomegranate
- Green tea, red tea, white tea, jasmine tea
- Polyphenols
- Natures biological response modifiers

This is the name that is given to by flavonoids, flavonodis catechines and heap of other flavor and size of flavanoids and a number of others.
Curcuma longa

These loosely called the body’s natural, biological response modifiers. A bit of a mouthful, but basically means they naturally enable the body to respond to allergens, viruses, expelling toxins, and so on. So they support the body’s natural systems.

Gingko biloba
Herbs and Spices

- Turmeric
- Garlic
- Ginger and Thai ginger
- Lemon grass
- Coriander
- Chilli's
- Coconut Milk

Turmeric is a very powerful anti inflammatory. More commonly used in injury prevention and reducing inflammation because it's so powerful that if you use too much you can actually suppress immune function. It's currently the subject of a big metical trial, combining with resveratrol because it knocks out a nasty pro inflammatory site called nuclear kappa B. Which is one of the driver forces behind many western diseases?
Gingko is also another good one knocks out nuclear kappa B, thins the blood, and improves memory. One of my favorites, Chinese green tea, very rich in catechines, flavanoids has numerous health benefits, lowers cholesterol, thins blood, protects arteries against heart disease, has sort of psycho active components in that it increases GABA and dopamine simultaneously in the brain it has a calming and stimulating action. So it makes it very good for making decisions under stressful situations, under pressure.

So really what we are talking about when we are increasing all these components is looking at all these types of food and increasing as many polyphenol rich foods as we can and enjoying a wide variety in the diet. We do make life a little bit simpler for athletes.

**STRESS**

Okay what we want to do now is look at stress. Another source of inflammation right, but absolutely necessary for adaptation. Chronic stress is pro-inflammatory. Acute stress is good and will stimulate the immune system. So what we are looking at here is natural and botanical moderation, moderators and modulators of the stress response.

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**Chronic Stress & Cortisol**

- The obvious;
  - Adaptation requires stress
  - Adaptation enhances function
  - Failure to adapt lowers potential function
  - Influencing the adaptation model is the corner stone to enhancing performance
  - Stress encourages release of stress hormone
  - Acute stress stimulates immune function
  - Excessive or prolonged stress causes imbalance in cortisol and DHEA production and suppress immune function
Here is a list of the changes in cortisol and DHEA production, the two key stress hormones or the two hormones related to the stress response.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Cortisol</th>
<th>DHEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rested Stage; Peak of super comp.</td>
<td>Normal</td>
<td>High</td>
</tr>
<tr>
<td>Alarm Stage</td>
<td>Raised</td>
<td>High</td>
</tr>
<tr>
<td>Resistance Stage 1</td>
<td>Raised</td>
<td>Normal</td>
</tr>
<tr>
<td>Resistance Stage 2</td>
<td>Raised</td>
<td>Low</td>
</tr>
<tr>
<td>Resistance Stage 3</td>
<td>Normal/low</td>
<td>Very low</td>
</tr>
<tr>
<td>Exhaustion</td>
<td>Low</td>
<td>In its boots</td>
</tr>
</tbody>
</table>

Obviously as you get more stressed you will produce less DHEA and more cortisol but when you get very stressed you can’t even produce any cortisol at all. So signs of stress would be depression where you get excess cortisol causing depression and low DHEA leading to sustained production.

Other signs of stress would be suppressed immunity, an unusual tiredness in the afternoon, a feeling which goes away and then you get a sort of night out feeling when you go into the evening. The only way to measure the way you are on this stress is scale is to have an adrenaline stress index test.
**ADRENAL STRESS PROFILE**
(Saliva) Age Group 30 - 39

<table>
<thead>
<tr>
<th>Sample 1 7:00-8:00</th>
<th>Sample 2 11:00-12:00</th>
<th>Sample 3 16:00-17:00</th>
<th>Sample 4 23:00-00:00</th>
<th>Total Daily Cortisol</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.8</td>
<td>2.2</td>
<td>2.7</td>
<td>1.4</td>
<td>24.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DHEA Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample 2 am</td>
</tr>
<tr>
<td>0.23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample 1</th>
<th>Sample 2</th>
<th>Sample 3</th>
<th>Sample 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DHEA : Cortisol Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4</td>
</tr>
</tbody>
</table>

- **Cortisol Levels:**
  - Sample 1: 17.8 nmol/L (12 - 22)
  - Sample 2: 2.2 nmol/L (4 - 8)
  - Sample 3: 2.7 nmol/L (3 - 7)
  - Sample 4: 1.4 nmol/L (1 - 3)
  - Total Daily Cortisol: 24.1 nmol/L (20 - 40)

**DHEA Levels:**
- Sample 2 am: 0.23 nmol/L
- Sample 3 pm: 0.44 nmol/L

**Comment:**
Adrenal Stress Type: Cyclic Variation: Overall this is an indication of normal adaptation to both chronic and acute stressors, however there is some variation in the individual timed readings. (See page 2 for specific indications). In the context of a patient with very long-standing stressors (years) it can indicate either good coping/adaptation methods, or represent hormone levels "dropping through" normal ranges on the way to depleted levels after having been over stimulated for many years. In such a case a follow up test in 2 - 3 months is recommended.

**Reported by:** SB
Here is one where you can see normal levels on waking and then low levels in the afternoon and then normal levels in the night. So not having this information would be terrible if you are using an intervention to lower cortisol. Because if you use an intervention to lower cortisol in the afternoon you are just going to make someone feel worse and more tired and cortisol you need some of it for the normal immune function.

In terms of moderating cortisol simple stuff works best okay.

**Cortisol Modulation**

- Simple things work best;
- Carbs
- Vitamin C
- Glutamine
- Protein
- Before using other botanicals

Things like vitamin C, glutamine, cheap, widely available taking proteins and carbohydrates in and around training vitally important. Glutamine, one of my favorites also useful for cell volumizing effects and heals gut mucosa so it has a sort of three fold effect.
Glutamine

- **Potential as cortisol suppressant** (Hickson, R., et al 1995)

- **Potential as immune supportive agent**
  
  (Nue, J., & Li, N 2002)

- **Cell volumising effect in cells**
  
  (Candow, D., et al 2001)

- **Assists in gut integrity** (Lacey, J & Wilmore 1990)

Potential cortisol specific. Very good to take a bit in the morning just to take the edge of your stress. Increases GABA so the brain rhythm hormones and has a relaxing effect used by the immune system. The immune system will go to the muscles scavenge glutamine from the muscles to feed itself in an acute illness so that’s why you lose a lot of muscle tissue if you get colds and flu and you don’t eat properly.

Phosphatidyl serine useful but very expensive, excellent for lowering cortisol and very good for mental acuity sort of higher learning ability but a little too expensive to use extensively across big squads.
### Phosphatidyl Serine

- 400mg in morning and in evening
- Cortisol suppressing effect
- Stimulates LH may indirectly raise T levels
- Important for neurotransmitter systems
- May help improve mental acuity during competitive or stressful situations


Any of you here interested to do more reading around stress responses to key text and if you need any more reminding any encouragement to take more rest and recuperation then that should be here you are.

Great stuff that is not nutritionally related but can enhance DHEA is basically anything that can make you laugh.
DHEA Enhancing Habits

So love is good for DHEA. It’s like a list of stuff you do in the sixties.

Laughter,

positive affirmations you know you are great, you are great in the mirror every morning.

The grateful log writing down ten reasons, ten things that you should be grateful of every evening.

It has to be different ones but we can repeat the same ones if they are very strong. If you are particularly stressed out you would only start out with a few and they would be quiet like you know someone opened the door for me today but actually joking apart the grateful log has been and has been shown to improve the immune response with chronically stressed people.

Okay some of my favorite ones would be breathing autogenic training, relaxation, meditation, yoga and so on. Now the body can’t obviously distinguish between the different types of stress whether they may be which is why you need mental strategies as well as physical nutritional ones.
Stress, Sleep and the Cortisol Connection

- Key Text; The Cortisol Connection; Talbott
- Exercise induced stress and mental stress are the same to the body
- Avoid becoming stressed out unnecessarily
- Use stress management techniques like meditation and visualisation to help combat mental stress
- If you are not sleeping well seek help, there are many natural remedies which help proper sleeping patterns

Adaptogens are something which can really help moderate the stress response and might be in the central part of any performance enhancing program.

Adaptogens
- normalizing action
- general action
- non-toxic

Important researchers:
- Brekhman
- Panossian
- Wagner
They are different and superior to stimulants in more than a single way. That’s not to say that we would not use stimulants to improve performance but often a combination of stimulants with adaptogens seems to be the best way to go.

What they do effectively is stop the body going into resistance stage one and speed the body’s ability to get the alarm’s stage. So they allow those stress response to occur but they prevent the body from becoming overly stressed.
The use has been extensively studied in the military. Military is a good place to look for new protocols and things like that obviously they are using it, its life and death. We think its life and death and its horrible to lose but they take things a little more seriously.
Use of adaptogens in military medicine

One of the best ones I have liked to use over the years is tyrosine which is not on any sort of classic list of adaptogens. It is an amino acid but it does behave very like an adaptogen because it prevents the depletion of adrenal hormones and brain hormones which you use up during severe stress. Improves swim time of rats who have been shocked. Improves accuracy of combat troops shooting at targets in very cold weather and it may improve the contractual strength of muscles. So it’s very good to take in pre work out.
Tyrosine

- Substrate for catecholamines

- Boosts brain noradrenaline levels
  (Gelenberg AJ, et al., 1982)

- Useful therapeutically to combat stress & overtraining
  (Banderet LE, 1989)

- May improve contractile strength of muscle

They have been used in space for a long time. Both by the Russian space projects and by NASA.

**Use of adaptogens in space**

(IBM P)
Now there are four of my favorite ones here I am going to talk through briefly some of the functions.

**Adaptogens**

- Adaptogens improve immunity because of their ability to allow individuals to sustain an adaptive response and minimise some of the systemic effects of stress

- Siberian ginseng
- Aswaganda
- Schizandra
- Rhodiola rosea

---

**Siberian Ginseng** has nonspecific action on and reduces activation of the adrenals in response to stress and we get less adrenal depletion. It also prevents immune suppression in terms of lymphocytes and thorough hormones which you get if you are overtraining. It’s not from Siberia and it’s not even a ginseng but it has very many similar properties.

**Ashwaganda**, well the Indian name for it is horse’s smell. You know you have got the right stuff because when you smell the packet it smells like a horse. And it is also called sleep making in Latin. It is very sophomoric so take it at night. Encourages very deep restful sleep. Very restoring for the adrenal gland which is the essential part of any program which is built around adrenal function. Its got a non-specific action in supporting the HPA which is adrenal, pituitary and hypothalamus access which is basically your stress response, stress triangle.

**Shizandra** is used for liver. Regenerates liver tissue. Very good for lungs, very good for bacteria related infections in the lung. It is also a potent aphrodisiac. So lot of these things, aphrodisiac wise, if you gift someone an aphrodisiac they start feeling better, livelier, has a good effect on their performance. So you can look at a list of aphrodisiacs and many of them will have potential benefits to their performance.
Probably one of the strongest and most widely used in military and space programs is Artic Root or **Rodiola rosea**. Increases blood flow to the brain, to the muscles, stimulates cognition and memory. Calms, stimulates a bit like green tea so very good for decision making and distress. Some of the mechanisms and actions are listed here. So what you are looking at here is increases brain, muscle heart energy in response to stress.
Phytomedicine, Vol. 7(2), pp. 85–89
© Urban & Fischer Verlag 2000
We have developed these online guides on immunity where we are going to put in all these ingredients which are going to support immune function plus we haven’t developed it yet but we are going to do a little booklet of recipes, three day eating plan.

You can do seven day immune plan, you can do seven day entry pack, you can do seven day recovery pack, and you can make a pack for anything you want really. But these are quite handy.
As soon as you sense illness

- Make sure you are eating lightly according to the basic principles
- Take colloidal silver
- Increase your intake of vitamin C
- Drink Cat’s Claw tea and add ginger and lemon

| If you have a cold then take a dessert spoonful of Sambucol 4 x per day |
| Use Manuka honey in detox tea to clear mucous and support immunity |
| Increase use of bovine colostrum |
7 Day Immune Packs

<table>
<thead>
<tr>
<th>There are 2 of each type of ingredient in each compartment</th>
<th>Take half of 1 compartment with breakfast</th>
<th>Take the other half at dinner</th>
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<tbody>
<tr>
<td><strong>EACH IMMUNE PACK CONTAINS;</strong></td>
<td><strong>Active Ingredients</strong></td>
<td><strong>Methods of Action;</strong></td>
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<tr>
<td><strong>TOTAL DAILY IMMUNE</strong></td>
<td><strong>Mushroom Extract / Vitamin C</strong></td>
<td><strong>Antioxidant and Immune Boosting Properties</strong></td>
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<td>Mineral Ascorbates</td>
<td>Calcium, magnesium, zinc ascorbates</td>
<td>Alkaline, bioflavanoid support</td>
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<td>Power Dophilus II</td>
<td>Pro Biotic Formula</td>
<td>Body’s first Line of Defence for bacterial and yeast infection</td>
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<tr>
<td>Echinacea Complex</td>
<td>Mixed Echinacea Extract</td>
<td>Powerful Immune Stimulant complex</td>
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<td>Maxi Zyme</td>
<td>Proteolytic Enzyme blend</td>
<td>Breaks down mucous</td>
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<td>Maxi C Complex</td>
<td>Vitamin C and bioflavanoid Complex</td>
<td>Immune Support and bioflavanoid benefits</td>
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<tr>
<td>Bromelain</td>
<td>Pineapple Extract</td>
<td>Proteolytic blend, breakdown mucous immune stimulant</td>
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Immune function is often compromised during periods of stress or hard training.

Each 7 Day immune Pack is Hand Prepared for specific individuals.

They contain the best most potent nutrients and herbs which have proven benefits for health and immune function.

Using more than one supplement supplies a principle of synergy where the whole is greater then the sum of its parts.

Convenient to take and effective at reducing symptoms and duration of common cold.
In case of inflammation, antioxidants are only part of the story. The second part of the story involves omega 3 fats. The omega 3 to 6 fatty acid ratio. So if this is out of balance then it will cause excessive inflammation in the body. Inflammatory pathways that you need to support and correct.

We recently tested 32 players and I am ashamed to say that not one of them had the correct ratio of omega 3 to six despite supplementing for over two years.

Quite why this was I am not sure. I think one of the reasons was that it was an upper lot that they used fat that was involved in digestion and absorption and possibly detoxification which will interfere with integrating these fats into the membranes.

Those of you who wished to go and do any further reading, these are two key texts the other one is called Radiant Health or The ancient Wisdom of the Chinese Tonic Herbs by Ron Teegarden. Unfortunately he is not alive anymore but his company still sells is one of the best sources of adaptogens you can go to.

I just wanted to talk though how we put some of those ideas together that I have been discussing so far and here is the pre rugby world cup and nutritional support system in terms of different areas sleeping, recovery, anabolic, adaptogens.
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<th>NUTRIENT INTERVENTION</th>
<th>PHASE I - PORTUGAL</th>
<th>PHASE II BATH</th>
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I will only discussing one of the formulas that I used. I am going to keep the other for a couple for a secret for the time being. And you can see different phases of training two big blocks I think gone into the main period of competition using different types of adpatogens and other antigenic as we went through.
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<tr>
<th>NUTRIENT INTERVENTION</th>
<th>BREAK</th>
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And in terms of the body systems okay we have spoken about bioactive proteins, gut health, we have talked through toxins liver, oxidative stress inflammation; this is called the vicious cycle of chronic toxic overload. This is exactly why all those factors combine to suppress immunity and that is exactly why you need to support each system in turn when you are supporting the immune system.

So what about some protocols. Well one protocol that is vitally important is for gastrointestinal problems. Because they are number two on the list of most commonly occurring illnesses sort of the case upper respiratory tract infections then is GI because often you are playing away from home so.
PROTOCOLS

- Activated Charcoal
- Probiotics
- Colostrum

Treats acute GI upset and food poisoning.

- 5HTP*
- Mg & ZMA
- Chamomile, valerian
- Hops, herbal complexes
- St John’s Wort*

Treat sleeping difficulties
*use with caution

Activated charcoal and high strength probiotics and colostrums and that’s the best protocol for even things like rotavirus. Activated charcoal grabs on to the nasty pathogens, takes it out the intestines, replenish all the bacteria replenish all the beneficial bacteria support the immunity and colostrums will talk about its specific actions. Colostrums acts like bioactive protein, repairs gut mucosa.

But when we use any of these interventions we need to know how many to use what time. So understanding the recovery stage of an athlete is important. We have used various methods over the years but the one we have hit on the most and the simplest and the most effective is just total training time. And in the past we have combined this with questionnaires and rate perceived exertion as well but now we actually just use total training time.
How do you assess recovery status?

- Self assessment helps you decide when to look after yourself better

- Methods include;
  - Clinical signs and symptoms – body comp
  - Training volume / intensity
  - Visual analogue score
  - Player status monitoring questionnaire
  - POMS

Some date it from GPS and some match data. We have looked at a lot of hormonal testing but from everyone I have spoken about from the hormonal testing we have done, what it will tell you that are in terms of testosterone and cortisol, what it basically tells you, you train less, you perform better. And your testosterone tests will be higher generally. That generally means that you will have a better performance.
ATHLETE ACTION

› Use a questionnaire based system to keep a track of your well being and recovery

› Pay close attention to all aspects of recovery

› Use your training diary and training analogue to keep on top of recovery needs

› Learn to recognize early stages of illness

› Contact the nutritional team in the early stages of any illness
ACTION

☐ Use a questionnaire based system to keep a track of your well being and recovery

I would encourage an athlete to gauge their own recovery status and that could be through very simple questionnaires. An athlete’s education is absolutely key to making the right intervention at the right time.
Example of Questionnaire

Owen Anderson (PP 163) uses a shorter questionnaire to monitor the performance status of the athletes he coaches. Each morning the athletes assess themselves against the following six questions:

- I slept well last night
- I am looking forward to today's workout
- I am optimistic about my future performance
- I feel vigorous and energetic
- My appetite is great
- I have little muscle soreness

They rate each statement on the following scale:

- 1 - Strongly disagree
- 2 - Disagree
- 3 - Neutral
- 4 - Agree
- 5 - Strongly agree

If their score is 20 or above then they have probably recovered enough to continue with the training program. If their score is below 20 then they consider rest or an easy workout until their score rises again.

Okay many people know when they are coming down with an illness and we are not mind readers so we need to have good lines of communication so we can make the right intervention at the right time.

Of these listed here manuka honey is one of the only naturally occurring compounds which can kill the MRSA bug, but some bucos and elder flower extract which has got some clinical support to reduce the symptoms and severity of the common cold virus.
Dietary Summary – Background Support

- Follow the basic principles, especially Recovery
- Monitor your recovery status using questionnaires
- Use lifestyle habits to avoid getting ill in the first place
- Keep cool and use stress management and time management to keep your system strong
- System support means digestive wellness
- If you feel unwell or are becoming ill then listen on...

Of course the many life style habits which you can do which will reduce the incidence of illness in terms of basic personal hygiene, washing hands, disinfecting, places where many hands meet so door handles, bar bells and using the alcohol hand wipe just maintaining hydration just as we spoke about earlier and taking care to avoid excessive fluctuations in core temperature so wrapping up warm during training session, not having the car heat on full, stay cosy, like a chicken, turn off the central heating on in the night, stay nice and cozy in bed.
Lifestyle Habits to Avoid Illness

- Basic hygiene
- Wash hands regularly
- Avoid ill people
- Avoid places where many hands meet
- Avoid dehydration
- Never share glasses or drinks bottles
- Pay particular attention to post training immune support during winter months
- Maintain constant temperature
- Avoid frequent fluctuations in temperature

As soon as you sense illness

- Make sure you are eating lightly according to the basic principles
- Increase your intake of vitamin C
- Drink Cat’s Claw tea and add ginger and lemon
- If you have a cold then take a dessert spoonful of Sambucol 4 x per day
- Use Manuka honey in detox tea to clear mucous and support immunity
- Increase use of bovine colostrum

When we are building menus we have a number of considerations. And these are the list of foods that we have to avoid because all of these will disrupt immune function. In terms of supporting digestive wellness obviously probiotics are the key. Bioactive proteins because of their naturally occurring immune compounds and immunoglobulin’s
will take the burden off us having to produce them ourselves and our own immune system.

Anti-Nutrients and Empty Calories

- All refined foods
- Sugar (except post training)
- Excess Caffeine
- Alcohol
- Cakes, biscuits and pastries
- Crisps and confectionary

- Soda Pop
- Refined Wheat
- Chips
- Fast and junk foods
- Snack a jacks
- Doughnuts
- Breakfast cereals
- All chemically assisted foods

Basically, if that happens then the immune system can get on with other things such as restructuring muscle, rebuilding muscle and repairing muscle structures so it has an anabolic effect. If you take these bioactive proteins as a nitrogen retention effect in the body so you hold on to more protein than you can get rid of.
Digestive Wellness

- Probiotics help support proper immune function
- 80% of immune function is based in the gut
- The first 20g of protein you eat is used by the immune system
- Eat live unsweetened yoghurt regularly
- Use glutamine to heal the gut lining
- Avoid wheat and other allergens

Colostrums basically, is filtered plasma. So it is pretty much concentrated blood and you can get different types of colostrums. One of which is hyper immune colostrums which is where they have taken the cow and immunized it against lots of disease and what happens if you immunize a cow or chicken against a disease and then you take filtered plasma or concentrated plasma you get a transfer effect.
Colostrum

- Filtered Plasma
- Hyper immune bovine colostrum
- Transfer Factor – immunity to calf
- Passive Immunisation;
  - IgG1
  - Lactoferrin
  - Peptide Trophic factors
- Digestive wellness
- Leaky gut
- Improves nitrogen retention
- SlgA increases
- Roto Virus
- 3-4 tablespoons per day
- Robert Rowntree MD leading researcher

So just like when a calf drinks the mother’s milk or colostrums we get the transfer effect and so we then enjoy the benefits of that cow’s immunity or chicken’s immunity. So they have got immune enhanced eggs now and so on. This is down to the thing I was talking about before which is that lactoferrin or sometimes called transfer factor.

Obviously there is knock on effects on gut mucosa bioactive proteins, stops things like leaky gut. You do need to take a lot of these products okay. It’s no good taking a couple of colostrums capsules. It’s a waste of money. You need to take three or four table spoons a day. So you need to find a nice clean cheap source of these compounds to use with your athletes.
Chicken Soup is Medicine

- Chicken Soup is a proven immune boosting recipe
- Thai Tom yum soup has additional immune and recovery benefits
- Both of these will help recovery from injury and immune support

Chicken soup is one of your grandma’s best immune boosting remedies. It’s now got clinical proof okay. Chicken soup is a medicine. If you add tom yum soup paste to it you will increase the medicinal benefits and for reasons we have spoken about before. Now they are not sure if it is the steam, the chicken fat, components in the ingredients reducing excessive in mucous production maybe the tender loving care factor. But if it tastes good it will increase secretory IgA, reduce mucous production and have a direct immune sporting effect.
**CHECK LIST**

- Am I thirsty?
- When did I last eat?
- Did I eat Protein with that?
- Were there veggies or fruit with that?
- Did I eat Starch according to my training?
- Were there ‘good’ fats with the meal?
- Am I eating sweets all the time even when I have not trained?
- Do I eat wholefoods?
- Am I thirsty?

Knowing this and knowing that it makes you happy is also going to have a beneficial effect of your immune system. So the quicker you get to eat something tasty or hot following a hard training session in winter the quicker you are going to avoid lively pathogen invading and then making you ill.

There are so many supplements which are useful to immune function. We have spoken about many of them already. But there is a couple I would like to finish off with.
Supplements to Support Healthy Immunity

- Colloidal Silver*
- Glutathione Boosters
- Glutamine
- Antioxidants and Co Q 10
- Whey protein
- Colostrum
- American ginseng*

- Minerals
- Omega 3 Fatty Acids
- Probiotics
- Grape Seed Extract
- Green Tea Extract
- All detox supplement
- NAC
- Purified bovine serum

One of these is glutathione. So glutamine is one of the best immune boosters also NAC or N acetyl cystine which acts as a sort of detoxification support glutathione booster.

Glutathione is one of the things the liver uses one of the major detoxification paths so it clears up the toxins and you avoid that cycle of chronic toxic overload which can make you ill suppress your immune system. American ginseng is twenty times more effective than echinacea. So stop taking echinacea and switch to American ginseng. American ginseng is American Indian ginseng. So it grows in America. If you email me I can give you a good source that I use to get that.

Colloidal Silver this is one of my favorites and a natural alternative turn to antibiotics. So a long history of medicinal use and the minute particles of silver attached disrupt and cause cell death in bacteria and viruses and it's very easy to use. You can get sprays, drops that you can hold on to your tongue and there is plenty of research to support this use in topically increasing speed of healing in wounds and obviously orally supporting hosts immunity and basically killing pathogens on contact.
So in terms of putting it all together what we need to do is have an optimal diet recovery protocols which will support host immunity day in day out, winter through summer. Then at key periods of time, key periods of training competition and higher infection risk would be to use specific supplementation, foods, and habits during the high risks periods.
And then have an additional set of protocols ready in terms of immune enhancing, pathogen destroying interventions at the onset of illness. And when the onset of illness is through with proper lines of communication with our athletes. Here is the list of some of the things that we might use at each of those different stages.
Colloidal Silver, American ginseng, Immune packs, Echinacea, goldenseal, elderflower extract, vitamin C to bowel tolerance

All the above in lower doses, plus zinc lozenge, colostrum, glutamine and increase the below

Daily Probiotics, high polyphenol dense diet, adequate omega 3 intake, sufficient protein, chicken soup, organic foods, fresh foods, zero trans and low omega 6 fatty acids, low allergy, low refined carbohydrate based diet

I hope you have learnt a lot from this document, as with all the products that I create I like to answer any questions you may have about anything that is in this booklet. The best way to do that is to leave a comment here.

If you insert your name here whenever I make updates to this book I’ll be sure to let you know so you are kept up to speed with the latest developments.

Visit my shop as I procure and supply many of the supplements mentioned in this book.

Matt Lovell
Elite Sports Nutritionist
www.SportsNutritionVlog.com
Matt Lovell

Matt began his interest in sports at an early age starting Karate at 12. These interests led to a life-time obsession with all things training, nutritional and health related.

After gaining his instructors qualification in Karate, he went onto coach fitness at his local amateur boxing club.

After completing a degree in Political Philosophy at Bristol, Matt couldn’t keep away from the health and fitness arena and qualified as a personal trainer; eventually running his own company in the City. This led to developing his other passion: nutrition. Matt undertook a further three years of study at the Institute of Optimum Nutrition.

He went on to spend time on Harley Street, specializing in elite sports, female hormonal health and body composition management.

The contacts he made through this work led to a spell, working as nutritionist with Millwall football club during which time they made the play-off for the Premiership and also qualified for the FA cup final.

In 2002 Matt started working with the England Rugby Team and was part of Clive Woodward’s team that lifted the World Cup in 2003. He continues in the same role working with the England team and was a member of the team who against all the odds reached the final of the 2007 Rugby World Cup. Matt is the Sports Nutritionist for London Wasps, London Irish, Saracens and Leicester Rugby Clubs.

Matt currently runs his own elite performance based company. This is aimed at elite athletes and corporations and includes all levels of health related performance. He has written the popular Fat Loss Program ‘Four Week Fat Loss’ and ‘Regenerate’ a muscle building anabolic program.