

Go Longer.



Ultra Recovery

Spike-FREE.

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A silhouette of a runner is shown in profile, running along a shoreline. The sun is low on the horizon, creating a bright reflection on the water. The sky is filled with soft, white clouds. In the background, there are dark, silhouetted hills or mountains. The overall scene is peaceful and evocative of a long-distance run in nature.

Ultra Implications.

Full sun, 6000 feet of elevation, thirty miles, three more sessions this week, lot of food – yes, there are implications for the ultra endurance athlete.

...more to the story ?

Every Ultra athlete knows about inflammation, injury, and infection, and understands the need for quality food and rest. **But what is actually happening, when we run, bike, swim so far?** Endurance performance and health can be optimized, or put at risk, depending on our approach to training, recovery, lifestyle and diet.

A close-up photograph of a gnarled, weathered wooden branch. The wood is dark brown and black, with a rough, textured surface. The branch is curved and appears to be part of a larger structure, possibly a piece of driftwood or a branch from an old tree. The background is blurred, showing a hint of a blue sky and green foliage.

A degree of oxidation-inflammation is needed as part of the training process.

However research into Ultra training and racing highlights certain health biomarkers significantly rise and others go down - Here's what it means, and what to do about it.

Oxidation

Inflammatory
Mediators

Muscle breakdown

Cortisol

What shoots
UP

What heads

DOWN

Immune
Resistance

Thyroid/Adrenal
health

Gut
integrity

Ultra training and racing triggers a number of changes to your physiology – some things shoot up, while others head down.

Managing these ups & downs has tangible paybacks,

- a) Short-term: more frequent and longer training sessions,
- b) Over-time: reduced injury, infections & chronic disease,

Every athlete is different - therefore listening to your body, and understanding its response to training and accelerated recovery approaches is paramount to optimum performance.

1

Ultra induced inflammation & Gut/GI inflammation

Endurance training/racing has shown to raise inflammatory markers and powerful cytokines (cell messengers), like IL-6 and TNF. Now some amount of these substances are healthy (immune triggers), but too much is a problem. Endurance exercise can more than double the level of these inflammatory markers, versus pre-exercise levels. The body can handle small changes, but sustained elevated spikes are a risk.

These inflammatory spikes, are further exacerbated from high consumption of sugar-based fuels, commonly used in training and racing.

Exercise of longer duration, shunts the blood from the GI/Gut, that in addition to the heat and commonly dehydration results in a hypoxia (no blood) and breakdown to the gut membrane – allowing toxic inflammatory compounds to flow into the blood. [Read the full story here.](#) Again simple sugars further exacerbate, gut membrane integrity.

2

Ultra induced oxidation

Endurance training/racing raises substances (reactive oxygen species, or free-radicals) which cause lipid peroxidation and cell-wall breakdown. The body has many enzymes to manage free-radicals, but post ultra race levels can reach almost 90% over, pre-race levels. Aside from acute inflammation, free-radicals have been directly related to cardiovascular disease, ischemic conditions, apoptosis (cell death) and aging.

3

Ultra induced muscle damage

Blood tests following endurance exercise, shows heightened levels of Creatine kinase (CK), and myoglobin – both being markers of muscle damage, and post exercise soreness. In fact in ultra-events, markers can remain high for two-five days after race (or training) completion, indicating ongoing muscle damage.

Interestingly, high CK levels (muscle damage) is correlated with higher IL-6 inflammation levels. While some foods can help repair muscle damage, studies indicate that prevention (from damage, by ultra-marathon) has not been demonstrable.

4

Ultra immune, thyroid and adrenal fatigue

Studies on ultra-marathon finishers, have shown >25% incidence of upper-respiratory tract infections within two weeks post race. Research suggests a decreases in mucosal immunity (IgA) following marathon events. Again, high consumption of sugar (bars, drinks, gels in training/racing) reduces vitamin C transport into white blood cells impairing immunity.

Consistently, ultra-distance training and racing creates acute rises in cortisol levels (raises blood sugars, immune suppression, decreases bone formation, and inhibits collagen formation). Multiple studies have shown reductions in hypothalamus-pituitary-adrenal and thyroid hormones following ultra-racing.

Carbs-Insulin-Fat-Inflammation

Belly fat. Most people don't like the sight of it. In reality though, it's what's happening under the surface, that's most concerning. In recent years, research is showing the link between adipose tissue and systemic inflammation. Here's what we know about how this inflammation happens.

It
starts
with
high

INSULIN

Sugar is a poison: according to Robert Lustig, MD, a UCSF pediatric neuro-endocrinologist. Lustig's research suggests that it's less about the calories, and more about the effect of fructose on insulin. Chronically elevated insulin (from fructose consumption) blocks Leptin – which is meant to make us satisfied after meals, and regulate fat storage. He believes this to be the key reason, why obesity, insulin resistance and diabetes is higher now, than 30 years ago.

THEN...
Abdominal
Adipose
Tissue

Insulin resistance and abdominal adipose (fat) tissue, go hand in hand. It's true that aerobic exercise drastically improves insulin sensitivity and reduces obesity. However, with endurance athletes commonly consuming highly-dense sugars daily in their training and diet, there has been a notable rise in the 'skinny-fat' (skinny all over, but the abdomen) athlete profile.

FINALLY...
Your own
inflammation
factory...

Now the most troublesome part. This fatty tissue, promotes the production of inflammatory cytokines. These substances are not only creating systemic low-grade inflammatory (pain) symptoms for athletes, but place the athlete's longevity (chronic diseases) in higher risk bracket – [more on that here](#).

Protein: Managing Insulin and Maximizing Recovery

Meats, dairy, fish, eggs, beans – they have almost no carbs, and therefore have no effect on blood-sugars and insulin – right? **WRONG**. While protein foods do not raise blood sugars, they can and do raise insulin levels, which isn't great for the fat burning athlete. **SO** – what to do?

Lets
first
get
specific
on
PROTEIN

Firstly, let's be clear – **PROTEIN IS CRITICAL** for endurance athletes. Recovery, muscle repair, immunity, and hormonal balance are dependent on protein to function. The consistent advice is that athletes probably need, 1 - 1.5 gr/Kg per day.

However in 1997, a paper was published by Susan Holt on the insulin response of 38 foods. One of the findings in this paper was how strong certain protein foods stimulated insulin. Dairy foods like milks, yoghurts, and baked beans strongly stimulated insulin, eggs and soft cheeses had the least effect, while beef and fish were somewhere in between.

Let's first recognize that the reason insulin spikes with protein is because it is insulin that helps transport the amino acids (protein) out of the blood and into muscles.

SO...

When is it best to use protein?

So, focus more on,

1. Protein consumption during and after training.
2. Don't snack on dairy between meals.
3. Use the lower insulin-stimulating proteins like eggs, soft cheeses, and quality meats during your Fat-Training weekday sessions and rest days.
4. For training/racing >4 hours, we recommend taking Glutamine and BCAA every hour, for best recovery.

Sugar - Inflammate and Infect.

Since the 80's there has been a tectonic shift in the consumption of carbohydrates for endurance sports, training and racing. Bars, Gels, drinks filled with syrups, sugars, grains are marketed as healthy training aids – and ultimately they hit the blood as 'glucose'... how bad is this – [read more here.](#)

SUGAR,

cells

and

Vitamin C

levels

After the discovery of the role of Vitamin C for immune function, various medical researchers in the mid-late 1980s found that Vitamin C levels within white-blood cells was dramatically different in diabetic patients. It was found that Insulin governs how both Glucose AND Vitamin C move into cells, with the transport mechanism having an affinity for Glucose. In a state of hyperglycaemia (high glucose in blood), cellular levels of Vitamin C/Ascorbic acid become low.

THEN...

Immunity

down

and

inflammation

up

For white blood cell immune and adrenal anti-inflammatory functions to work effectively, they require high levels of Vitamin C/Ascorbic acid. With the negative impact of glucose on cellular vitamin C levels, its no surprise to see diabetic patients suffer from acute inflammatory responses, susceptibility to infection and faulty wound repair.

ATHLETES...

Constant carb
consumption

...impact?

As per noted in this guide, athletes have higher infections and inflammatory mediators after Ultra racing and extended heavy training loads. We propose that higher sugar in the ultra racing and training lifestyle contributes to this immune weakness and hyper-inflammatory state.

Overtraining: Thyroid & Adrenal

For decades, sports physiologists have shown the relationship between over-trained athletes and deficient thyroid, adrenal hormone production. These hormones play such a critical role in ultra recovery, that athletes need to be sensitive to this issue, and what to do about it.

EXCESS

Exercise is
where the
problem
begins...

Exercise (stress) triggers the sympathetic nervous system to secrete thyroid hormones. At the same time, exercise also increases cortisol levels (from the adrenal glands) which can negatively impact the conversion of thyroid hormones into their active form. Now with rest - cortisol comes back down, and thyroid hormones take effect on facilitating recovery. But with insufficient recovery and poor nutrition, we enter a downward spiral of increasingly over-stimulated adrenal-thyroid glands.

THEN...

Hypo-thyroid
and Adrenal
fatigue sets in

Hypo-thyroid is the last thing endurance athletes need – with fatigue, weakness, weight gain muscle cramps-aches, depression as common symptoms. Adrenal fatigue is no better, with our sleep quality being impacted, we desire sugar and snacky foods (late night snacks), and increase urination, causing less control of critical minerals like sodium, potassium and magnesium.

SENSE IT

...how do we
know we are
at risk?

Bring conscious and sensitive to any progression of these symptoms is critical for the ultra athlete. In heavy training-cycles, measuring declines in morning resting heart rate, and higher HRV (heart rate variability) are good indicators, you need to course-correct training, and lifestyle.

ULTRA Gut: Implications...

We shouldn't be surprised that nausea and GI distress continues to be [the #1 cause of DNF at ULTRA endurance races](#). But, beyond finishing Ultras and Triathlons, there's an even more serious sinister concern regarding exercise induced Gut health impacting our longer term health and longevity. [The whole article here.](#)

GUT

Impact of
Endurance
Exercise.

The GUT: the 8 meter (on average) long, hollow (should be) tube, running from the mouth to the butt. Extreme endurance exercise has a direct impact on GI/GUT Health, due to,

1. The Blood shunt from the Gut to working muscles,
2. Raising core body temperature & Gut permeability,
3. Simple carb/sugars inflaming the Gut membrane,
4. Gulping un-chewed gels/fluids into the stomach,

... the issue is
way beyond
Just feeling
sick in a race

The scientific community is now well published with papers measuring the specific changes to the intestinal tissue integrity, caused from prolonged exercise. The tight junctions in the intestinal wall, can effectively break down with the heat from exercise, distressing the GI tract and increasing gut permeability. Studies have shown how food molecules (peptides from proteins, inflammatory endo-toxins in the gut) which, under normal rest conditions are not seen in the blood stream, suddenly increase in presence in the blood, post-exercise. Other studies have photographed the dramatic damage to intestinal mucosa (gut lining) as the tissue suffers from repeated reductions in blood supply over multiple days.

4 Solutions: To the problem
[CLICK HERE.](#)

Insulin, inflammation and Oxidation.

1

Whey plus exercise, reduced deep adipose tissue and improved insulin resistance. In a study on women, high intakes of anthocyanidins, and flavonols (berries, cocoa, red wine) were associated with lower insulin resistance and inflammation. In a study on 100 subjects, Cocoa showed to lower lipid peroxidation and inflammatory mediators TNF, C-reactive protein and IL-6 significantly. Whey and tomato juice improved oxidative status in marathon runners. Adding psyllium to foods positively manipulated glucose responses on study subjects, and when Cocoa flavanols were consumed over 12 week period, adipose tissue and insulin resistance was reduced. In multiple studies, Stevia has shown to have positive effects on glucose metabolism. A Diet rich in Vitamin C foods (Papaya, Strawberry, blueberries, Broccoli, Bell Pepper), and low in sugar-glucose will help raise adrenal and white blood cell levels of ascorbic acid, needed for effective inflammatory control and immunity.

Muscle Damage

2

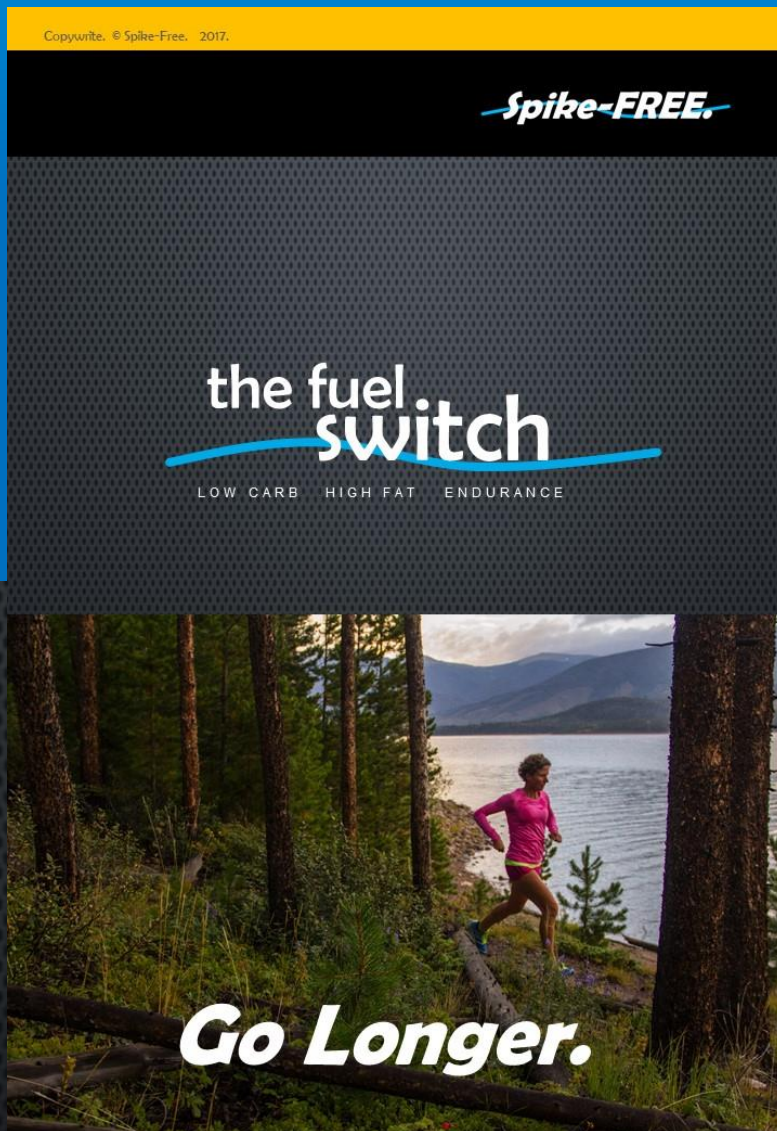
In a meta-analysis of 14 studies, of 600 subjects, whey protein demonstrated (with exercise) to drive significant increases in lean body mass (muscle). Even in patients with immobilized appendage (cast), taking Whey, drove faster recovery of isometric force and concentric power output. In a study of 30 subjects, whey protein group, demonstrated significant increase in strength and lean-muscle mass vs. those not taking whey protein. In subjects with eccentrically induced (like running) muscle damage, whey protein isolates, reduce the decline in muscle strength. Further studies on eccentric muscle damage have shown, whey protein to accelerate the recovery of muscle torque (strength).

Immunity, Thyroid and Adrenal recovery.

3

Consuming a mix of quality proteins like eggs, whey, and a ultra-low GI carbohydrates can help dampen immune-suppressing cortisol, post exercise. Reducing sugar consumption will help raise Vitamin C levels in white blood cells, for improved immune responses, and help refuel adrenal glands for hormone production. Avoid ALL soy based foods and products, that can further dampen thyroid hormonal production. Weekly inclusion of clod-water fish, high in iodine and omega-3 fats, will support healthy thyroid hormone production.

Download the [Quick-start guide here...](#)



AT

Berries

Low GI fruit

Dense anti-oxidant
Anti-inflammatory



Have with greek yogurt, or straight. Or have with coconut oil, cocoa & stevia.

30AD

Cocoa

Insulin sensitivity
Dense anti-oxidant
Anti-inflammatory



Take cold/hot drink with xylitol/stevia. Keep to >85% Dark chocolate - low sugar.

Protein...(w/out Sugar)

Insulin sensitivity
Muscle repair
Anti-inflammatory
Anti-oxidant



30AD

AVOID: Hi-Carb/sugar, whey powders, bars, shakes.

Whey: add to smoothies, shakes. Eggs in smoothies, boiled, slow/low fried in butter. Red meat, fish (deep sea the best) slow cooked. Per day: Plan meals to 1-1.5grams per Kg of body weight. To facilitate rapid recovery in Intense training, take post workouts... 4 x 1000mg Glutamine, 4 x BCAA Complex (800mg Leucine, 400mg Isoleucine, 400mg Valine)

Red Wine
anti-oxidant
relaxant



EV

AT

Dense antioxidant foods

Tomato's, Broccoli, Spinach, Garlic: maximize antioxidant levels and availability by slightly cooking/blanch-steaming them. Add pure vanilla and cinnamon to smoothies. Blackberry, blueberry, Raspberry are all high in antioxidants. Add turmeric, to casseroles, curries – even better take high-dose 1000mg capsules daily.

Immune support

Add fresh garlic, ginger to cooking. Add Bakers yeast to cereals/baking. Include Echinacea capsule daily.

WM

Other super-foods

Take Beet, for high nitrites to dilate blood vessels. Psyllium fiber on cereals or toast, to reduce blood sugar spikes.

Juice or Smoothy?

Either is ok. However fresh juice contains concentrated sugars, so add some fibre back in, or greek yogurt to dampen down the spikes. Smoothies are a complete food.

AT Any time.

30AD Best during or 30mins after exercise.

EV Evening.

WM With meals.

Quality Sleep

The National Sleep Foundation recommends adults (25-65) need 7-9 hours of quality sleep per day. Keep sleep-start and wake-up times the same day to day. If getting to sleep is hard, shift some of your exercise sessions to the afternoon, and add some relaxation routines, before you get in bed.



Blue light spectrum, emitted from phone and tablet screens react with ~30,000 cells inside your eyes. These cells inform the brain to turn off melatonin production from the pineal-gland. This change in melatonin production, directly impacts the daily circadian rhythms of daily sleep and waking patterns.

Relaxation Routines: Yoga and Meditation

Switch one session per week, to a very low aerobic workout focused on stretching and strength with attention to [deep nasal diaphragmatic breathing](#). Yoga and Tai Chi are good routines to work with.

Introduce daily time for restful meditation routines – again focus on deep nasal diaphragmatic breathing. Check iTunes or similar online store, for many free guided meditation routines to help you get into these meditative states.

Laughter/Sadness

Recent studies have shown laughter has a strong positive transient effect on the autonomic nervous system, while sadness has a weaker, but sustained negative effect.

When you need to actively recover, take timeout for enjoyable social time with fun, happy family and friends.

Caffeine & Alcohol

Caffeine is a natural stimulant of both the nervous system and the adrenal gland. It peaks in about 30mins after consumption, and has a half life of 3-5hours, but can still be measured in your body 8-14hrs later. In reducing the load on the adrenal gland, and best enabling sleep, we advise to dramatically cut back on caffeine during active recovery periods. Using alcohol to induce rest, relaxation is slippery slope. A small glass of red wine is OK, but shouldn't become a 'dependency' to relax or sleep.

Heart Rate Variability

The variability of our heart rate, is determined by our autonomic nervous systems balance. Tracking our HRV each morning, will give you a quantitative indicator of over-training risk.

If you are an ultra endurance athlete – you should get smart and learn how to measure HRV. [CLICK HERE.](#)

Reduced Volume

Transient reductions in mileage/time will definitely help recovery. For active recovery, reducing cortisol (stress) levels is important.

We generally recommend replacing 2 aerobic 1Hr sessions, with 1 HIIT 20min workout per week of active recovery.



Training and
1bar every
2-3 Hours



Post workout
recovery



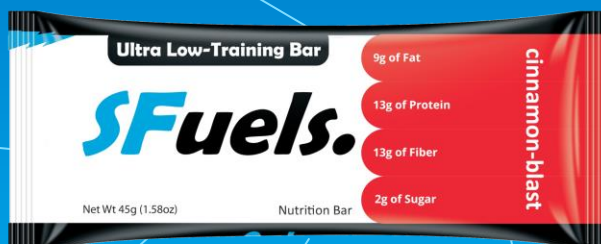
As a morning
cereal

Anatomy: Ultra Low-Training bar.

Train the fat-burning energy metabolic process in the body by minimizing blood sugar/insulin spikes through avoiding the use of simple sugars, starches, honeys, maltodextrins, wheat, rice, oats, corn, grains and flours.

Use quality medium-chain fats that can be directly converted into fuel without the blood sugar/insulin spike, like coconut oils and butters. Avoid cheap vegetable oils (sunflower, canola etc.) that typically get stored as adipose-tissue/fat and trigger inflammation.

Optimize fuel metabolism, lean-muscle mass recovery, reduce immune-suppressing (cortisol) effects of ultra-training - by feeding low allergenic highest quality whey protein isolate - rather than cheap soy, rice and milk protein extractions.



Minimize known allergenic, inflammatory and difficult to digest foods - like grains, flours, peanuts.

Feed the gut micro-biome, with prebiotic resistant starches.

Minimize unwanted gut distress, bloating and gas in training and racing, by avoiding bars and gels with fructose, sugar alcohols like Malitol, Erythritol, Manitol or others.

Ultra
Recovery

One more thing...



Remember...

There's nothing
like
Ultra Rest.

Spike-FREE.

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