Boost your ride

Performance Q&A *The big cycling questions answered by our team of expert coaches, nutritionists and riders*

01 CAN BOOSTING TESTOSTERONE HELP ME DEFY AGEING?

In August of this year, UK Anti-Doping (UKAD) confirmed that former Team Sky doctor Richard Freeman had been banned for four years for "taking possession of an order of 30 sachets of Testogel (testosterone gel)" at the National Cycling Centre in Manchester in 2011. The lack of charging any riders smacks of throwing said doctor under the team bus, but that's another feature for another time. For now, we've used Freeman as a high-profile, nefarious vehicle to highlight the performance potential of testosterone – and why the passage of time can see both testosterone and performance levels plummet. Let's lift the lid on age-related decline and what you can do about it...

Leg it
Work your big muscles for best results

What is testosterone?
Testosterone is a hormone – a chemical messenger that's secreted, in the case of men, from the testicles into the blood, which carries it to organs and tissues of the body to stimulate a number of functions, many of which are conducive to stronger cycling efforts. As a snapshot, testosterone preserves and increases lean muscle mass; improves cognitive function; increases bone density to help prevent conditions such as osteoporosis; and improves your ability to recover from a workout. Those are the headline benefits. But it's also responsible for driving the process of creating red blood cells, which is clearly nectar in a sport where your muscles are demanding oxygen. And then there are performance boosts that tap into the psychological.

"Studies have suggested that testosterone contributes to behavioural adaptations driving greater voluntary effort. For instance, working harder during sessions," says Dr Amy Vivien Wells, senior lecturer in exercise physiology at the University of Hertfordshire. "This is highlighted in a study linking pre-exercise salivary testosterone levels with self-selected resistance training workloads and performance in female netball players. Also, non-physical psychological priming such as watching a video can positively influence pre-exercise testosterone levels and subsequent exercise performance."
So, watch a particularly passionate cha-cha-cha on *Strictly Come Dancing* and you'll smash your next TT.

FAST FACT

Testosterone is a molecule that's made up of cholesterol, so it's suggested you tick off good-quality fats, such as mackerel, nuts and good-quality olive oils. Or take a cod liver oil supplement

Images Getty Images

Age is more than a number
From around the age of 40 years old, testosterone levels can drop by around 1% each year. It's one key reason why sedentary folk lose 3-8% of their muscle mass each decade after they turn 30 with this decline accelerating after the age of 60.

That ageing decline is exacerbated by endurance training. Studies have shown that 90mins of sub-maximal exercise results in a slight decrease in testosterone levels, while exercise of moderate to hard intensity for more than 2hrs results in a significant decrease in testosterone levels. Why remains unclear but it's suggested that increased cortisol levels (stress hormone), a loss of body mass and changes in luteinizing hormone, which helps to create testosterone, could be responsible. A study at the 2011 Ironman World Championships in Hawaii highlighted this exercise-induced testosterone drop as out of 22 long-distance triathletes tested, only nine showed serum testosterone concentrations that would be considered normal.

Female cyclists endure this testosterone drop, too, with around a 10th of men's levels circulating in the system. In women, it converts to oestrogen, which plays an important role in reproduction, growth and general health.

Small changes, big rewards
The performance picture isn't good. Thankfully, there is help at hand in the form of weight training. Regular gym work is the opposite of endurance in that it raises testosterone levels, and remains why there's a strong argument that anyone over 35 should split their week between 80% riding and 20% strength work. This could be weights, bodyweight moves or plyometrics. Whichever you choose, there's evidence that power output, speed of recovery and stamina all go up – or at least ameliorate losses – and all because of increasing testosterone levels, which are then maximising gains from endurance rides.

As for which exercises you should tick off, leg squats, deadlifts and lunges are essential, not only because they're leg-based and so is cycling, but because of their size. "The consensus is that the volume of muscle mass activated is linked with the testosterone response," says Dr Vivien Wells. "The absolute workload (volume and intensity) of the strength session is thought to be linked with the testosterone response, too. Greater stimuli from engaged muscle mass may increase production of testosterone by sympathetic stimulation of the testes."

As for the breakdown of each session, back to Vivien Wells. "When looking at resistance training, hypertrophy protocols (high volume, moderate to high intensity and short rest intervals) are more likely to elicit a significant increase in testosterone than pure strength protocols (low volume, high intensity, long rest periods)."

We should assess our diets, too. The journal *Alcoholism: Clinical and Experimental Research* revealed that alcohol lowered testosterone levels, especially if drinking more than two pints a day. This could be because alcohol inhibits the synthesis of testosterone. Still, if that's the price of reaching our goals in 2024, we'll stick to the Heineken 0.0. **James Witts**

"Regular gym work raises testosterone levels, and leg squats, deadlifts and lunges are essential"

Lift off
Keep the intensity up if you can

80:20
Cyclists over 35 should split their week between 80% riding and 20% strength training

02

HOW DO I RIDE IN THE COLD?

Smart indoor trainers are great for maintaining fitness levels over the winter but venturing out into the cold for regular road rides still has its merits. Riding in the cold not only builds physical stamina and mental resilience, but also equips riders with a greater range of road-handling skills, and an appreciation of getting out on the road more often when the good weather returns.

You want to layer up rather than rely on one big warm jacket. The reason being that in winter, when you set out first thing in the morning, it's usually around 0°C, but a few hours into the ride that could rise to 10°C. If using layers, it means that you're continually dressed for the conditions. The last thing you want is to be wet through with sweat, which will lead to you getting cold in the same way as if it were raining. Remember, water conducts heat 25 times faster than air.

In much the same way that you can strip off layers if you get warm, you want to be able to put layers on if the temperature drops – especially if it starts raining. So, it's a good idea to carry spares. If it's a cold, wet day, I'll take spare gloves, so when the first pair gets sodden, I can swap to the second pair. Another great spare to have on hand, particularly if you're stopping at a café, is a back-up baselayer. That way, you don't have a damp baselayer against your skin when setting off again.

A front mudguard will keep spray off your feet, enabling them to stay warmer for longer. It's the same with the rear, which will stop your backside getting wet through from the damp winter roads. Not only that, your bike and your riding comrades will thank you.

During the cold pre-season races, a pro team car will often hand up warm tea in bottles to the pros. You probably don't have that luxury; however, there are various thermo-insulated bottles on the market that you could use to similar effect. Fill them up with sweet tea to give you some extra calories.

Gravel riding is a great way to stay warm. Because of the increased rolling resistance, your average speed will be lower, as will the wind resistance; at 30kph, at around 0°C, that equates to a wind chill of a seriously cold -14°C. With the average speed you spin at being much lower off-road, this effect will be reduced. Not only that, but you're typically more sheltered if riding on forestry trails, which will also combat that less-than-welcome wind-chill factor.

Mark Bailey

25
Water conducts heat 25 times faster than air

Layer up
Wear layers you can take off as it warms up

FAST FACT

Be aware that when you're riding at 30kph at 0°C, this equates to a wind chill of -14°C

Get out there
You'll build up resilience when it's cold

03

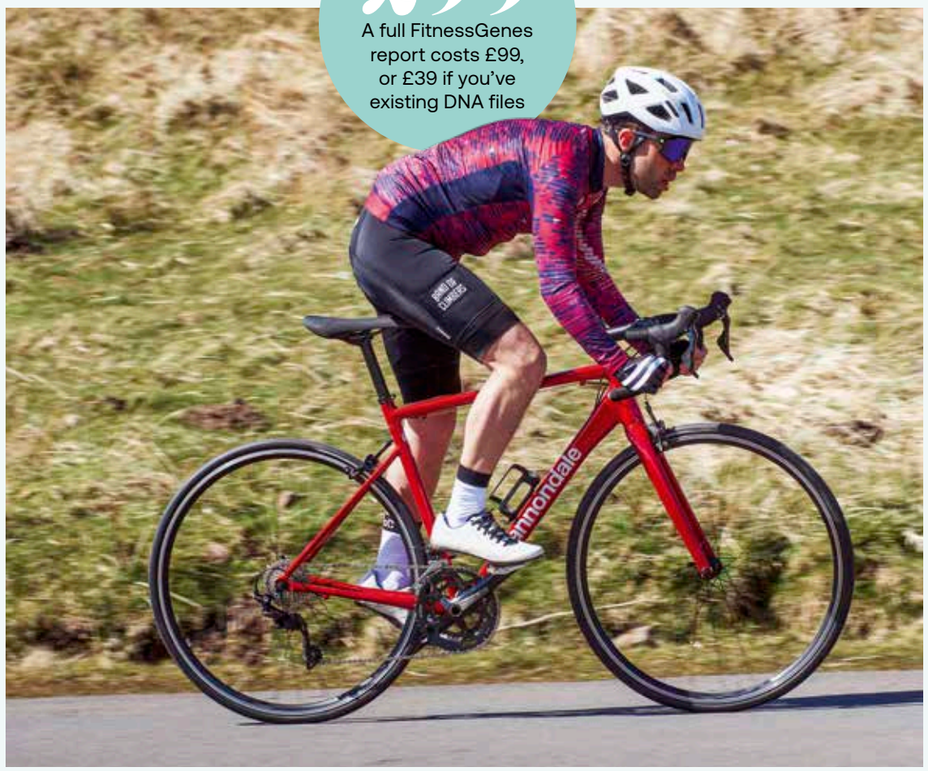
CAN A DNA TEST IMPROVE MY CYCLING?

Can a DNA test really unlock hidden talents in my cycling armoury? And can I still blame my parents for my endurance sport mediocrity? These are some of the questions swilling around my head as I dribble my saliva into a vial before sending it off to FitnessGenes, a UK-based company who specialise in analysing your DNA and prescribing personal fitness, lifestyle and nutritional plans.

FAST FACT

We inherit our genes from our parents, receiving one copy of each parent's chromosomes

£99
A full FitnessGenes report costs £99, or £39 if you've existing DNA files



Said saliva is fed into their system of over 600,000 genetic variants and, six weeks later, over 130 trait reports are delivered onto their website. Some of my results provide a welcome reassurance of things I know or have suspected about my physiology. I struggle with a Vitamin D deficiency (darn you, endless Star Wars universe), with my data confirming that I've an impaired activation of vitamin D2 and D3. I also get the shakes if I so much as walk past a Starbucks, with the results telling me that I'm a slow caffeine metaboliser and may not derive endurance benefits from slurping it.

Whereas I'm happy to finish in the top 80% of any bike race, I was once closer to the top end at ball sports, with my two copies of the T allele associated with higher skeletal muscle and quadriceps strength found commonly in football players. My gene variants suggest I have a strong morning preference and an above average risk of seasonal affective disorder, both things I'm aware of.

Good genes?
Start working to your genetic strengths

There are surprises, however, including my two copies of the short (D) allele, which is associated with higher levels of the ACE protein and a potential aptitude for power/strength performance and resistance training. Note that word 'potential' as I've barely attempted strength training, hence my Woody Allen-esque upper-body physique.

Weights here we come

Additionally, there are nutrition plans that calculate a daily caloric intake according to my genes, lifestyle and fitness goals. For me (168cm tall, 62kg heavy), that's 1,760 kcal (51% from carbs, 21% protein and 28% fat), with FG supplying a host of recipes (plenty involving sweet potatoes) so I can reach – but not smash – those numbers.

In terms of red flags, it says my genes are linked to higher ACE activity, which may increase my risk of high blood pressure and being overweight, the latter not helped by me being 'likely to display impulsive eating behaviour', which suggests FitnessGenes have looked at the snack tin under my desk. Elsewhere, I've an increased susceptibility to ageing, cell and DNA damage, due to slower clearance of toxic compounds, and a moderately reduced bone-mineral density.

All is not lost with my Tour de France dreams, however, as I apparently carry more endurance-linked alleles that increase my big ride potential than many, while I'm also a high responder to seeing improvements in lactate threshold following training. Time, then, for me to hit the weights section at the gym. Move over Jonas, your time is up. **Matt Baird**

Images Russell Burton; Steve Sayers; Snorri Tryggvason

50%
Cycling 32km a week can reduce your risk of heart disease by this much

04 HOW DO I STAY FIT OVER 60?

Statistically, we are at higher risk of heart disease, cancer and diabetes as we head into our 60s. Even healthy cyclists should keep an eye on their wellbeing. And the age-related decline in bone mineral and muscle mass speeds up. "That's why a lot of older people start to walk a certain way and feel stiff," says Phil Cavell, author of *The Midlife Cyclist*. The way we metabolise food also changes due to reduced insulin sensitivity over time, causing weight gain. "We're gaining fat but losing muscle, so we need to change that," says Cavell.

Daily hydration also becomes a much bigger challenge in your 60s. "Muscles carry water, so if you've got less muscle, you're naturally less hydrated," explains Cavell. "And we no longer metabolise alcohol efficiently, so drinking a lot in your 60s isn't a great idea. You need to think about your inflammation burden – through stress and training – much more carefully as well."

Sixty-something riders will benefit from an extra resistance session. "Drop out another cycling session and add in resistance training to preserve muscle mass, bone density and range of motion," says Cavell.

Cycling is definitely going to feel harder now. But if you can keep cycling, you're much less likely to suffer from certain diseases. "Exercise is an antidote to some of that," says Nichola Roberts, the owner of Velophysio. Riding your bike is arguably now more important than ever. "We need to keep going, but just be more intelligent in the way we do it," advises Cavell.

Age-related muscle loss affects Type 2 'fast-twitch' muscles more than Type 1 'slow-twitch' muscles, which means you are now better suited to endurance rides than harder sessions. But aim for a blend of the two. "Do a bit of intensity stuff and the bedrock stuff," says Cavell. He suggests staying a bit below your ideal heart-rate zones in training. But cycling can serve as a handy health check tool in older age. "If your heart rate is fluctuating or abnormal during training, or you get stiff hips or knees, it's worth seeing your GP," says Roberts. You may find you enjoy different aspects of cycling, adds Cavell. "You are capable of stunning performances, but all the dots have to join up." **Mark Bailey**

Go long
You're now better suited to endurance riding

Don't slack
Do some harder sessions too

FAST FACT

Increasing your calcium intake, through milk, cheese, Greek yoghurt, eggs and leafy greens, can protect your bone health. Fruit and veg will aid your immunity. Omega-3-rich food, such as nuts and seeds, will help protect your heart and joints

05 HOW DO I LOOK FOR A SECOND-HAND BIKE?

There are some great second-hand deals to be had out there but, as with all purchases, it's a case of buyer beware. The ideal would be to buy from trusted friends, club-mates or local riders, but you may need to cast the net a bit wider. Always search for bikes on reputable sites such as eBay that offer both protection for the buyer and accountability for the seller. There's also Cycle Exchange, which offers sells used road and gravel bikes. Be suspicious of adverts/postings that mis-label or poorly describe a bike, and avoid ads that use a generic image of the bike as you'll want to see images of the actual model you want to buy. Forums such as BikeRadar's also have classified sections.

Never buy a bike unseen and, if you're not confident or mechanically savvy, take a mate with you. Check the bike over thoroughly. Look for any obvious cracks or scuffs that might indicate that it's been crashed. Are the bearings running smoothly? Is it clean? Is the chain rusty? Are the tyres pumped up? If it's not in a well-maintained state for sale, has it ever been looked after?

If they're the original owner, they should have some form of proof of purchase if the bike's relatively new or they should be able to tell you about its history; if they're hesitant or vague, that's a red flag. Always be prepared to walk away.

Some local bike shops sell second-hand bikes. The bikes will often be serviced prior to sale and come with a warranty. Some bikes will be sold with future tune-ups included in the price. While it may be pricier than buying online, you'll have peace of mind that the bike's in good working order. **Nik Cook**

Q&A

What is anaerobic training?

This describes short, high-intensity activity, where your body's demand for oxygen exceeds the oxygen supply available. Instead, your body relies on energy sources stored in the muscles. Sprint work is almost entirely anaerobic, but a small amount of anaerobic training will help boost muscular power. Your anaerobic power is only available as short bursts of energy for no more than around 2mins. With the correct training, anaerobic power capacity can be increased to improve athletic performance.

Eat up
You'll need a lot of fuel for endurance events

What happens when you bonk?

This generally refers to a depletion of glycogen stores while performing endurance exercise. As your stores begin to run low, your body recognises the potential danger and slows the body down to conserve energy. If you continue to exercise, your body will shut down. You can prevent this by eating adequate amounts of simple carbs both before and during exercise.

How do body fat scales work?

Most use bioelectrical impedance, which sends a safe and low electrical current through the lower half of the body. Because it flows more quickly through water and muscle than bone or fat, the scale measures the speed of the current. Using that figure, the scale then estimates body fat using a multi-step, mathematical formula. Readings can, however, be thrown off by hydration levels, movement, foot calluses and muscle mass for example.

Need advice or help with any aspect of your cycling and/or lifestyle? *Email **cyclingplus@ourmedia.co.uk** and we'll find the answers.*

SIDE STEP-UP WITH LEG LIFT

Develop balanced strength to reduce the threat of injury

01 Hold a dumbbell in each hand with your arms hanging down by your sides. If you don't have weights, place your hands on your hips.

02 Stand to the right of a box or something similar and stable that'll act as a step. Up to about halfway up your shin is a good height.

03 Place your left foot on the step, pressing your weight through your foot. Straighten your left leg to lift your body up.

04 At the top of the step, you should then raise your right leg up and out to the side as high as comfortably possible, ensuring you keep your knee straight.

05 Lower your right leg back in and then down to the floor. Do this 10 times before switching sides. Do two to three sets on each side with 1-2 mins rest between sets.

Images Joe Branston; Getty **Illustrations** Georgie Sturge