



FREE GUIDE

Blood tests for athletes

Iron, vitamin D, energy and recovery: what the research supports, and when to test.

For amateur and professional athletes

A blood test does not stop an injury. It shows what you can change.

Injuries come from many things: training load, sleep, food, technique. Some of the risk factors sit in your blood, and those you can measure and act on with your GP. This guide gathers what the research supports, with the source of every point.

15 to 35%

of female athletes in the groups studied had iron deficiency^[1]

62%

of professional athletes in a UK study were under 50 nmol/L of vitamin D in winter^[7]

20%

fewer stress fractures with calcium and vitamin D in a trial of 5,201 female navy recruits (5.3% vs 6.6%)^[8]

It can

- ✓ Show risk factors you can change, such as low iron stores, low vitamin D or low B12
- ✓ Give you a baseline to compare against through the season
- ✓ Help you and your GP decide what to look at next

It cannot

- ✗ Stop an injury on its own: training load, sleep, food and technique matter too
- ✗ Tell you whether you are overtrained from a single number
- ✗ Replace an assessment by your GP or sports medicine team

Six points, with the evidence



01

Low iron is common in athletes, even without anaemia

Studies find iron deficiency in around 15 to 35% of female athletes and 5 to 11% of male athletes. It can be there before haemoglobin falls, so the number to look at is ferritin, your iron stores. Swiss sports medicine guidance reads ferritin under 30 µg/L as low stores in athletes over 15, and suggests checking about twice a year.^[1, 2, 3]

02

Knowing your iron changes what you do about it

In a meta-analysis of endurance athletes with low iron but normal haemoglobin, treatment improved iron stores and VO2max. A later review found better performance in only half of the studies, so the picture is mixed: measure first, and decide on treatment with your GP, not on a hunch.^[4, 5]

03

UK winters run vitamin D down

From October to early March, your skin does not make enough vitamin D from UK sunlight. In a UK study, 62% of professional athletes not taking supplements were under 50 nmol/L in winter. In a large trial in female navy recruits, giving everyone calcium plus vitamin D lowered stress fractures by about a fifth.^[6, 7, 8, 9]

04

Not eating enough for your training shows in the blood

The IOC consensus on Relative Energy Deficiency in Sport (REDs) lists blood markers among its signs: low T3 and, in men, low testosterone are main signs, raised cholesterol is a secondary sign, and falling iron is listed as an emerging one. No single test confirms REDs, but the pattern helps you and your GP or sports medicine team decide the next step.^[10, 11]

05

Your own baseline beats a population range

Creatine kinase (CK) and urea rise with hard training. Early research in athletes suggests CK is more useful compared with your own rested values than with a general reference range, and urea may be too. One test is a snapshot; repeated tests show your trend.^[12, 13, 14]

06

Being fit does not switch off heart risk

European sports cardiology guidelines estimate heart risk in adults over 35 who play sport using cholesterol, age, sex, blood pressure and smoking. A UK study of male endurance athletes over 40 with normal cholesterol found more coronary plaque than in less active men, mostly calcified; what that means for risk is still uncertain.^[15, 16]



What usually makes sense for your training



The weekend runner

parkrun, a 10K or your first marathon. Iron deficiency is common in runners, and many train through UK winters with little sun. Ferritin, a full blood count and vitamin D are a sensible start. ^[2, 7]



The gym regular

Heavy sessions raise CK, the muscle enzyme, for a day or more, so book your test after a rest day. Vitamin D, a full blood count and, for men, testosterone give you a baseline to compare against. ^[14, 17]



Team sports

Football, rugby, netball, hockey. Pre-season is the natural moment for a baseline, and a repeat mid-season shows how you are carrying the load. Iron, vitamin D and the muscle markers CK and urea are the usual core. ^[12, 14]



Endurance: cycling, rowing, triathlon

High training volume raises the chance of low iron and of not eating enough for the work. Ferritin, a full blood count and the markers the IOC links to low energy availability (T3, testosterone in men, cholesterol) are worth following across the year. ^[1, 10]



Women who train

Female athletes have the highest rates of iron deficiency, with menstrual losses on top of training. In the IOC consensus, missed periods are one of the main signs of low energy availability, and irregular periods also count. Both are always worth raising with your GP. Ferritin is the first number to know. ^[1, 10, 18]



Masters, 40 and over

Fitness does not switch off cardiovascular risk. Cholesterol, HbA1c (your average blood sugar) and kidney function join iron and vitamin D in the picture; how often to repeat is a decision with your GP. ^[15, 16]

What each marker shows, and when to repeat it

MARKER	WHAT IT SHOWS	WHEN TO REPEAT
Ferritin (µg/L)	Your iron stores. Under 30 µg/L reads as low stores in athletes over 15. Inflammation and a hard session can push it up, so it is read with CRP. ^[3, 18]	About twice a year; before an altitude block
Full blood count	Haemoglobin and red cells. Training expands plasma, so haemoglobin can read slightly low in trained athletes without true anaemia. ^[3, 19]	With ferritin
Vitamin D, 25(OH)D (nmol/L)	Your vitamin D status. UK guidance sets 25 nmol/L as the level to stay above all year to protect musculoskeletal health. A review of trials in athletes found no clear gain in performance from supplements. ^[9, 20]	Late autumn or winter; after supplements, as your GP advises
Vitamin B12 and folate	B12 and folate status. Vegan and vegetarian diets, or cutting out food groups, raise the risk of low B12. ^[21]	If your diet changes, or as your GP advises
Creatine kinase, CK (U/L)	Muscle stress after training. It varies with age, sex, muscle mass and the last session, so it only means something against your own baseline. ^[13, 17]	In a series, same time of day and same point in your training week
Urea (mmol/L)	Load and recovery, clearest in endurance sport. Protein intake and hydration also move it, so it is read against your baseline. ^[12, 13]	In a series, like CK
Testosterone (men)	Low testosterone in male athletes is one of the IOC's signs of low energy availability. It changes through the day, so keep the same time of day for each test. ^[11]	If there are signs of under-fuelling, as your GP advises
Thyroid: TSH, free T4, free T3	Thyroid function. A low T3 is one of the IOC's main signs of low energy availability. ^[11]	With a general check-up, or with signs of under-fuelling
Cholesterol: total, LDL, HDL	Cardiovascular risk, which matters most for masters athletes. Raised total or LDL cholesterol is also one of the IOC's secondary signs of low energy availability. ^[11, 15]	From age 35, as often as your GP advises
HbA1c	Your average blood sugar over the past two to three months. Part of a general health check, most relevant for masters athletes and a family history of diabetes. ^[1]	From age 35 or with a risk factor, as often as your GP advises
High sensitivity CRP	Inflammation. A hard session or a race raises it for a short time; measured with ferritin, it helps read your iron result correctly. ^[18, 22]	With ferritin

CHECKLIST

When to test



Start of the season

A baseline before pre-season or a new training block, to compare everything else against.



In a heavy block

Mid-season or in the build-up to a race, to see how you are carrying the load.



Late autumn or winter

When UK sunlight is not enough for your skin to make enough vitamin D.



After an injury or illness

Before you build back up, so your return starts from known numbers.



When your diet changes

Going vegan or vegetarian, cutting weight, or cutting out food groups.



Tired for no clear reason

Performance dropping, or tiredness that rest does not fix: talk to your GP, and a blood test is a common first step.

So your results compare^[14]

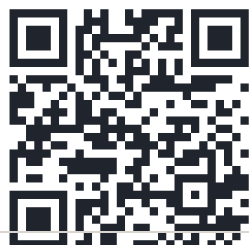
- ✓ Test after a rest day or an easy day, not the morning after a race
- ✓ Keep the same time of day and the same point in your training week
- ✓ Compare each result with your own previous ones

What to do with your result

Your result arrives in your account, with reference ranges. A value outside the range, or a symptom with a normal result, is a conversation with your GP: treatment and supplements are their call. With your numbers in hand, your therapist at BPR can help you plan training load and recovery.

References

1. Sim M, Garvican-Lewis LA, Cox GR, et al. Iron considerations for the athlete: a narrative review. *Eur J Appl Physiol.* 2019;119:1463-1478. doi:10.1007/s00421-019-04157-y. PMID 31055680
2. Coates A, Mountjoy M, Burr J. Incidence of Iron Deficiency and Iron Deficient Anemia in Elite Runners and Triathletes. *Clin J Sport Med.* 2017;27:493-498. doi:10.1097/JSM.0000000000000390. PMID 27606953
3. Clénin G, Cordes M, Huber A, et al. Iron deficiency in sports - definition, influence on performance and therapy. *Swiss Med Wkly.* 2015;145:w14196. doi:10.4414/smw.2015.14196. PMID 26512429
4. Burden RJ, Morton K, Richards T, Whyte GP, Pedlar CR. Is iron treatment beneficial in, iron-deficient but non-anaemic (IDNA) endurance athletes? A systematic review and meta-analysis. *Br J Sports Med.* 2015;49:1389-1397. doi:10.1136/bjsports-2014-093624. PMID 25361786
5. Rubeor A, Goojha C, Manning J, White J. Does Iron Supplementation Improve Performance in Iron-Deficient Nonanemic Athletes?. *Sports Health.* 2018;10:400-405. doi:10.1177/1941738118777488. PMID 29792778
6. NHS. Vitamin D. nhs.uk. 2026. <https://www.nhs.uk/conditions/vitamins-and-minerals/vitamin-d/>
7. Close GL, Russell J, Cobley JN, et al. Assessment of vitamin D concentration in non-supplemented professional athletes and healthy adults during the winter months in the UK: implications for skeletal muscle function. *J Sports Sci.* 2013;31:344-353. doi:10.1080/02640414.2012.733822. PMID 23083379
8. Lappe J, Cullen D, Haynatzki G, et al. Calcium and vitamin d supplementation decreases incidence of stress fractures in female navy recruits. *J Bone Miner Res.* 2008;23:741-749. doi:10.1359/jbmr.080102. PMID 18433305
9. Scientific Advisory Committee on Nutrition. Vitamin D and Health. Public Health England. 2016. <https://www.gov.uk/government/publications/sacn-vitamin-d-and-health-report>
10. Mountjoy M, Ackerman KE, Bailey DM, et al. 2023 International Olympic Committee's (IOC) consensus statement on Relative Energy Deficiency in Sport (REDs). *Br J Sports Med.* 2023;57:1073-1097. doi:10.1136/bjsports-2023-106994. PMID 37752011
11. Stellingwerff T, Mountjoy M, McCluskey WT, et al. Review of the scientific rationale, development and validation of the International Olympic Committee Relative Energy Deficiency in Sport Clinical Assessment Tool: V.2 (IOC REDs CAT2). *Br J Sports Med.* 2023;57:1109-1118. doi:10.1136/bjsports-2023-106914. PMID 37752002
12. Hecksteden A, Skorski S, Schwindling S, et al. Blood-Borne Markers of Fatigue in Competitive Athletes - Results from Simulated Training Camps. *PLoS One.* 2016;11:e0148810. doi:10.1371/journal.pone.0148810. PMID 26891051
13. Hecksteden A, Pitsch W, Julian R, et al. A New Method to Individualize Monitoring of Muscle Recovery in Athletes. *Int J Sports Physiol Perform.* 2017;12:1137-1142. doi:10.1123/ijsp.2016-0120. PMID 27967274
14. Haller N, Behringer M, Reichel T, et al. Blood-Based Biomarkers for Managing Workload in Athletes: Considerations and Recommendations for Evidence-Based Use of Established Biomarkers. *Sports Med.* 2023;53:1315-1333. doi:10.1007/s40279-023-01836-x. PMID 37204619
15. Pelliccia A, Sharma S, Gati S, et al. 2020 ESC Guidelines on sports cardiology and exercise in patients with cardiovascular disease. *Eur Heart J.* 2021;42:17-96. doi:10.1093/eurheartj/ehaa605. PMID 32860412
16. Merghani A, Maestrini V, Rosmini S, et al. Prevalence of Subclinical Coronary Artery Disease in Masters Endurance Athletes With a Low Atherosclerotic Risk Profile. *Circulation.* 2017;136:126-137. doi:10.1161/CIRCULATIONAHA.116.026964. PMID 28465287
17. Brancaccio P, Maffulli N, Limongelli FM. Creatine kinase monitoring in sport medicine. *Br Med Bull.* 2007;81-82:209-230. doi:10.1093/bmb/ldm014. PMID 17569697
18. Pedlar CR, Brugnara C, Bruinvels G, Burden R. Iron balance and iron supplementation for the female athlete: A practical approach. *Eur J Sport Sci.* 2018;18:295-305. doi:10.1080/17461391.2017.1416178. PMID 29280410
19. Mairbäurl H. Red blood cells in sports: effects of exercise and training on oxygen supply by red blood cells. *Front Physiol.* 2013;4:332. doi:10.3389/fphys.2013.00332. PMID 24273518
20. Farrokhyar F, Sivakumar G, Savage K, et al. Effects of Vitamin D Supplementation on Serum 25-Hydroxyvitamin D Concentrations and Physical Performance in Athletes: A Systematic Review and Meta-analysis of Randomized Controlled Trials. *Sports Med.* 2017;47:2323-2339. doi:10.1007/s40279-017-0749-4. PMID 28577257
21. Rogerson D. Vegan diets: practical advice for athletes and exercisers. *J Int Soc Sports Nutr.* 2017;14:36. doi:10.1186/s12970-017-0192-9. PMID 28924423
22. Kasis C, Thompson PD. The effects of physical activity on serum C-reactive protein and inflammatory markers: a systematic review. *J Am Coll Cardiol.* 2005;45:1563-1569. doi:10.1016/j.jacc.2004.12.077. PMID 15893167



Scan for the full page, the tests that cover these markers and the guided check-up.

bpr.clinic/blood-tests/athletes

General information, not personal medical advice. Talk to your GP about your own situation. Questions: hello@bpr.clinic or message us in the BPR app.

Reviewed October 2026