



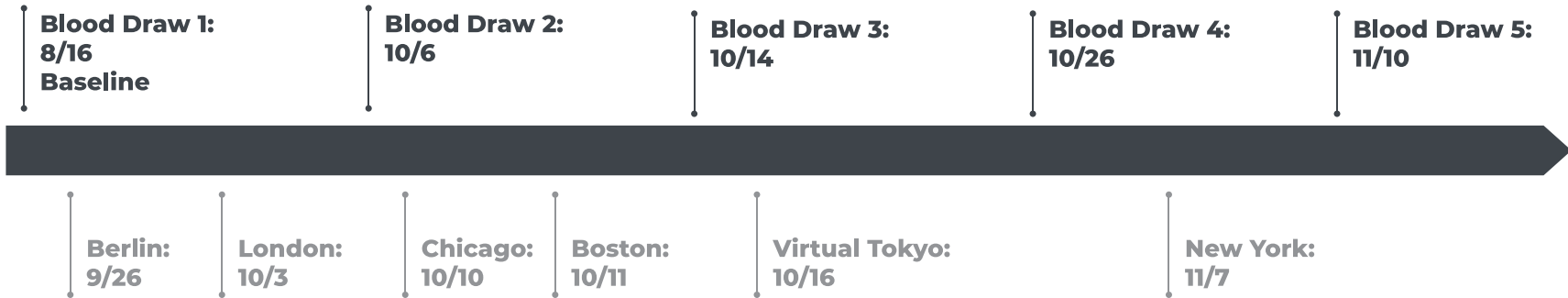
## Project Eclipse x InsideTracker

### **Inside Project Eclipse:**

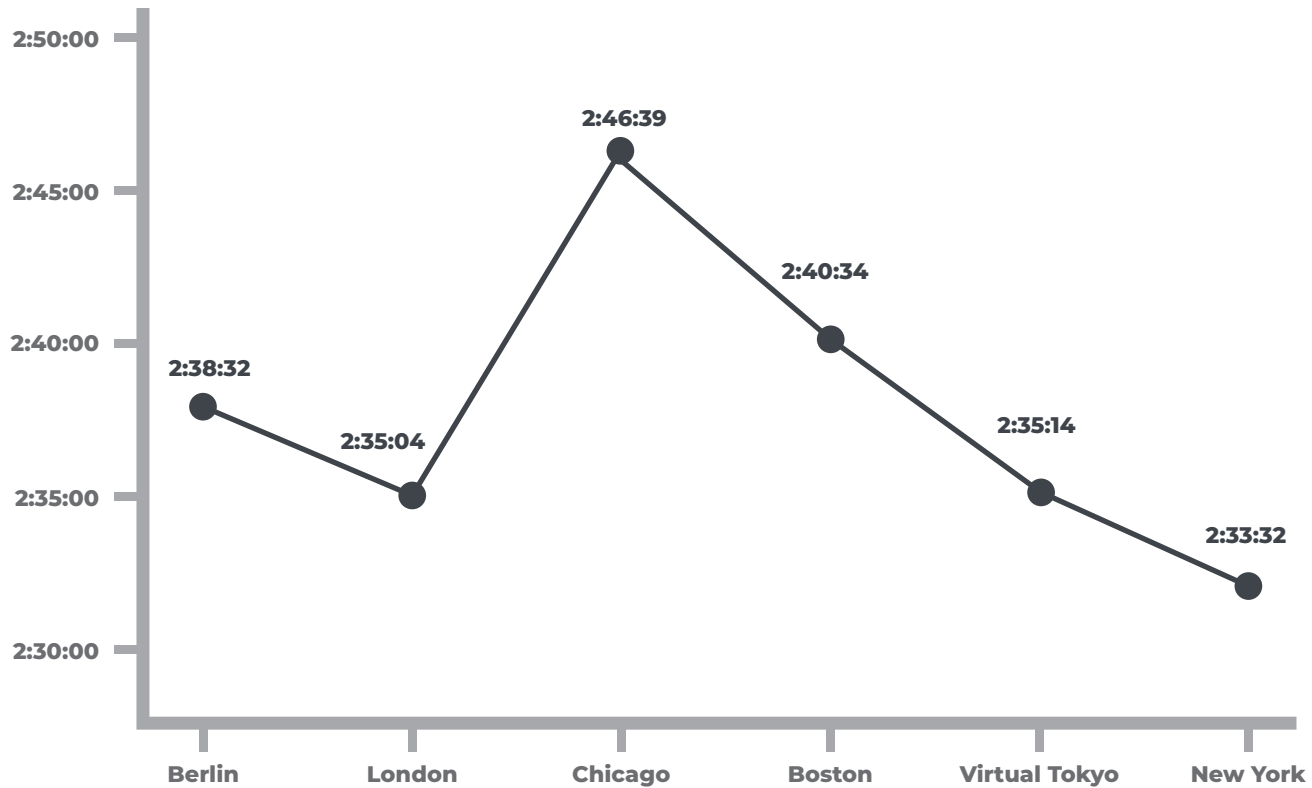
On Sept. 26, 2021, Olympic marathon and endurance legend Shalane Flanagan began an audacious journey to run all six World Marathon Major races in just seven weeks—with a goal of running each in under three hours. Even for an elite runner like Flanagan, this endeavor was a unique test of endurance, resilience, and recovery.

The team at InsideTracker took this once-in-a-lifetime opportunity to take a deeper look into Flanagan's blood biomarker response throughout the challenge. She ran five separate blood tests over the course of Project Eclipse to gain data-driven insight into how she can most effectively train, perform, and recover. By learning more about Flanagan's physiological response to the challenge, the InsideTracker team hoped to extract lessons that all athletes can apply.

## Timeline



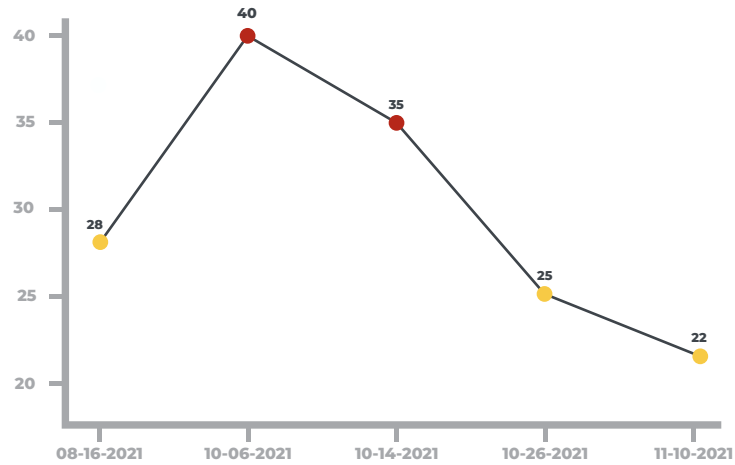
## Race Times



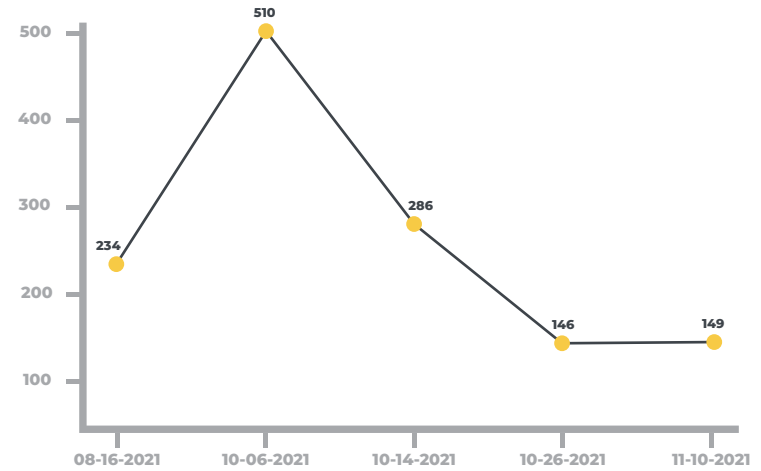
## Muscle Health/Physical Recovery/Inflammation

These markers often correlate and, together, give a detailed picture of physical stress and muscle breakdown.

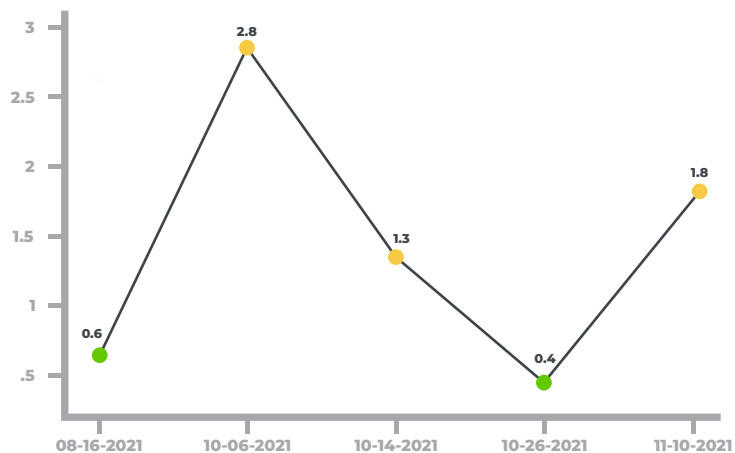
**Alanine Aminotransferase - ALT (U/L)** ALT is an enzyme found mostly in the liver. It is also found in skeletal muscle, where strenuous exercise can cause it to leech into the bloodstream and result in elevated levels for up to seven days.



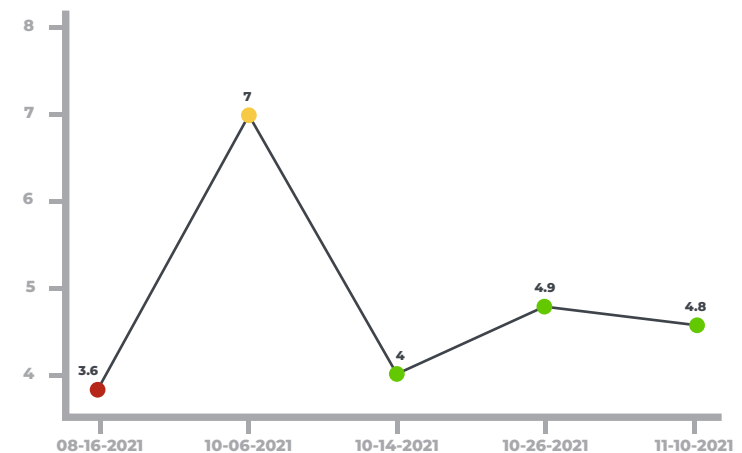
**Creatine Kinase - CK (U/L)** CK is an enzyme found mostly in muscle tissue. When muscle damage occurs, the amount of CK in the blood can spike.



**High Sensitivity C-Reactive Protein - hsCRP (mg/L)** HsCRP is a protein produced by the liver, immune system cells, and fat cells. It is released into the bloodstream within a few hours after inflammation resulting from tissue injury.



**White Blood Cells - WBC (thousands/uL)** High frequency of intense exercise, particularly in endurance sports, can reduce WBC and make an athlete more susceptible to illness.

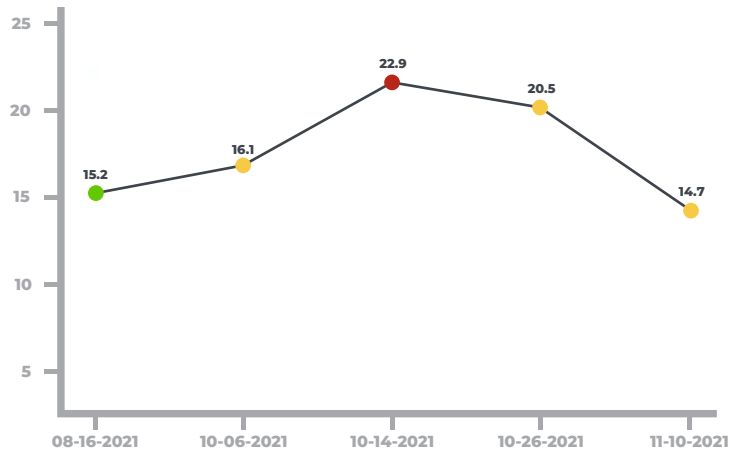


● Optimized ● Needs Improvement ● At Risk

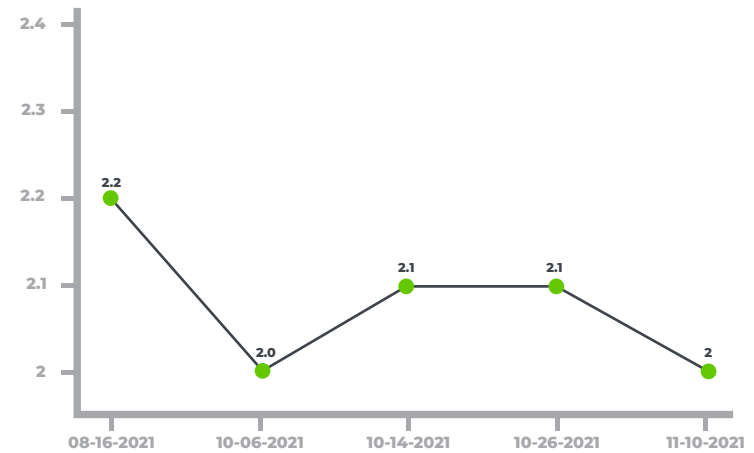
## Brain Health/Stress Response

These markers reveal how well a person is managing stress and can uncover areas of improvement for supporting quality sleep and an improved stress response.

**Cortisol ( $\mu\text{g/dL}$ )** Cortisol is often referred to as the "stress hormone." The body produces cortisol in response to both physical and emotional stress to initiate the fight or flight response—and re-wire how the body uses energy, aiding immediate energy needs.



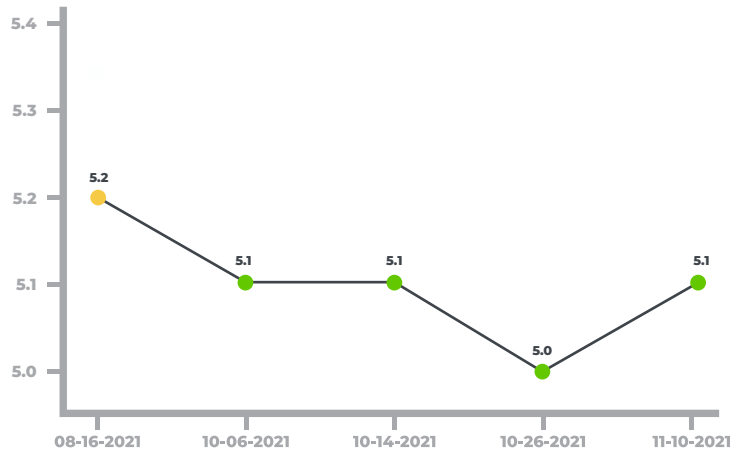
**Magnesium (mg/dL)** Magnesium assists in muscle contraction and relaxation. Adequate magnesium levels support heart health, sleep quality, and muscle repair.



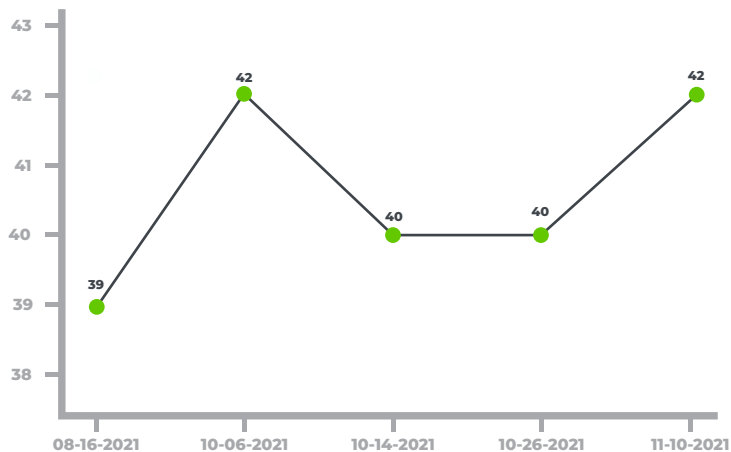
## Energy/ Strength/ Endurance

These markers are especially vital for long-term, intense athletic effort and are among the countless nutrients and hormones that work together to power athletic performance, recovery, and overall well-being.

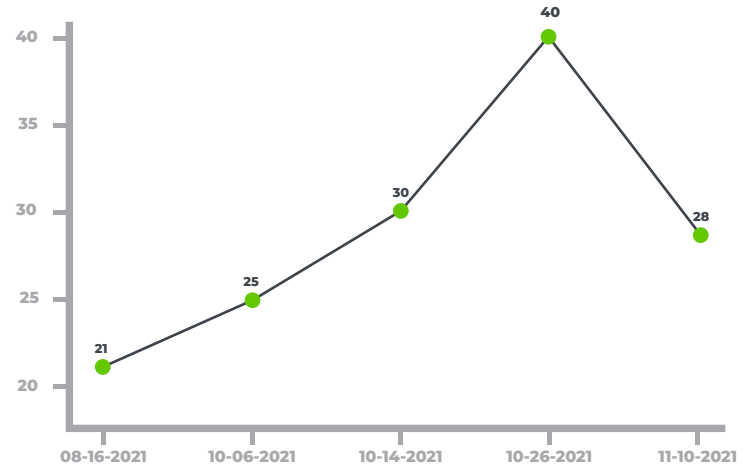
**Hemoglobin A1c - HbA1c (%)** Unlike a blood glucose test, which measures your recent blood glucose levels, HbA1c reflects average blood glucose levels over the previous 3-4 months. Sufficient blood glucose is essential for energy, however elevated levels can be detrimental to long-term health.



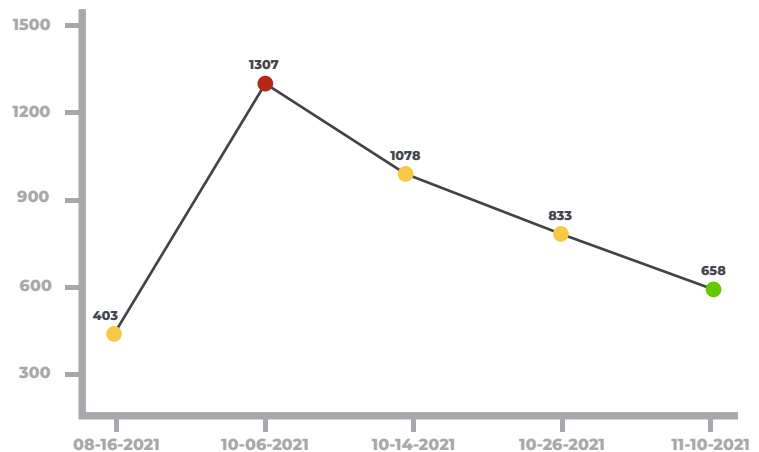
**Vitamin D (ng/mL)** Vitamin D is essential for bone health and muscle mass and strength, especially in the legs and lower body. It also plays a key role in healthy immune response.



**Testosterone (ng/dL)** Testosterone plays a key role in the development and maintenance of muscle mass, strength, energy levels, and bone density. Overtraining can cause a decrease in this vital hormone.



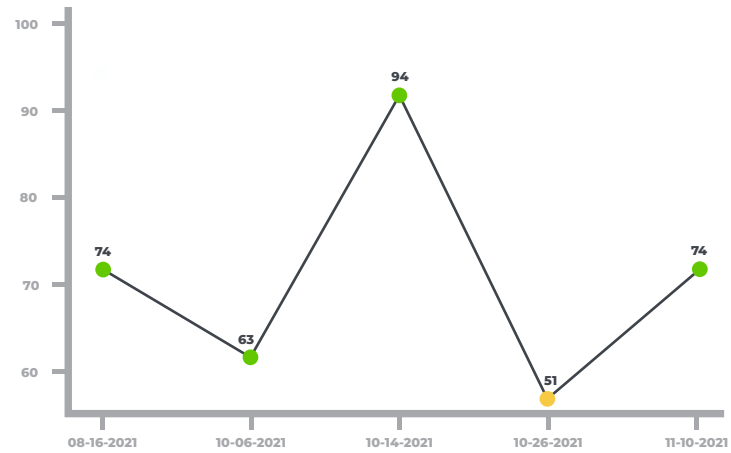
**Vitamin B12 (pg/mL)** B12 aids with brain and nervous system function and the formation of blood cells. B12 deficiency can lead to anemia, which leaves an athlete feeling tired and weak.



## Energy/ Strength/ Endurance

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**Ferritin (ng/mL)** Ferritin is a protein that binds to iron and reflects iron storage. Iron deficiency decreases red blood cells and hemoglobin, decreasing the oxygen carried to the muscles and brain, negatively impacting performance.



## Observations and Adaptations

### Test 1

#### Observations

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Elevated but reasonable levels of CK, ALT, and AST (indicators of muscle breakdown) due to pre-test training

Vitamin B12 below optimal zone

#### Adaptations

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Prepare for upcoming physical and mental stress by adding more antioxidant-rich foods, managing sleep and stress, and focussing on post-workout recovery

Include more B12-rich foods and add a B12 supplement

### Test 2

#### Observations

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B12 moved above the optimized zone

Elevated markers of muscle breakdown and inflammation

Increase in cortisol, reflecting physical and emotional demands of travel and racing

#### Adaptations

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Remove B12 supplement, continue focus on B12-rich foods

Focus on increasing overall nutrient consumption, with particular emphasis on immediate post-race or workout timing

Prioritize sleep, rest, and recovery

### Test 3

#### Observations

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Despite races on back-to-back days, markers of muscle damage and inflammation dropped remarkably from Test #2

Continued increase in cortisol— Expected given the stress of cookbook launch, travel, and back-to-back races

#### Adaptations

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Continue laser-focus on nutrient consumption in the immediate post-race or workout window

Continue to focus as much as possible on reducing stress and getting sufficient rest and quality sleep

## Observations and Adaptations

### Test 4

#### Observations

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Inflammation levels not only optimized, but below the baseline test!

Ferritin dropped below optimized zone

Slight dip in cortisol, likely due to a break from travel

#### Adaptations

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Continue focus on nutrient-dense foods, especially healthy fats, and on nutrient timing

Increase focus on iron-rich foods and return to a previous brand of iron supplement that had better absorption

Keep up the stress-reduction techniques applied during travel downtime

### Test 5

#### Observations

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Vitamin B12 moved into the optimized zone

Slight increase in inflammation markers, continued decline muscle breakdown markers

Cortisol levels dropped quickly back into optimized zone

#### Adaptations

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Focusing on B12-rich foods should be sufficient to stay in the optimized zone without supplementation

A testament to the importance of sufficient fueling, nutrient timing, and recovery, these markers being nearly optimized also showcase how well-trained athletes are remarkably resilient

Elevated levels during Project Eclipse were no surprise. Dropping quickly back to optimized showcase the power of Flanagan's day-to-day stress management techniques



# Key Takeaways

## Little Changes Have Big Impacts

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A key adaptation for Flanagan's physical recovery was getting the right nutrients at the right time. She is well-known for her focus on day-to-day healthy nutrition, but making small changes were key to optimizing the earlier muscle breakdown and inflammation results. For example, after Test #2, she began the practice of integrating a “finishline snack” and consuming nutrients immediately after a race or workout.

## What Gets Measured Gets Managed

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Flanagan noted she felt “about how she expected to feel” after Test #2. However, tests revealed that there was room to improve muscle breakdown and inflammation markers, based on research around nutrient timing and healthy fat consumption. This allowed her to feel “even better” after Chicago and Boston. Also, the team applied supplementation, which in Flanagan's case, worked a little too well—moving levels above the optimized zone. Interventions should be applied then tested to ensure they are having the desired effect.

## Think Big Picture

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Flanagan is the embodiment of the “high performer” archetype, a trait shared with most dedicated amateur athletes. As an elite athlete, coach, author, and mom, she manages multiple priorities—none of which would be possible without a strong foundation of long-term health, wellness, and resilience. When pursuing multiple big life goals, it's easy to overstep and create unintended negative effects on health. An objective, analytical approach to monitoring the long-term wellness impacts of a high-performance lifestyle is essential.