



**Proteomics International**  
LABORATORIES LTD

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## **OxiDx oxidative stress biomarker correlates with enhanced performance in Australian Thoroughbred racehorses**

- **New performance data in Thoroughbred racehorses shows racing without oxidative stress increased performance, with 88% of top-three finishers racing without oxidative stress: horses without oxidative stress were 76% more likely to place and 49% more likely to win**
- **OxiDx's patented technology detects a sensitive biomarker of systemic oxidative stress linked to muscle damage, poor recovery and increased injury risk**
- **The findings mark a key milestone confirming the OxiDx test's potential to enhance performance management and improve welfare outcomes in Thoroughbred racehorses**
- **Results presented today at the Australian Physiological Society (AuPS) Annual Scientific Meeting in Sydney, Australia**
- **Detecting musculoskeletal injuries is one of the largest problems facing the horse racing industry with a reported 85% of Thoroughbreds sustaining at least one injury during their two- and three-year-old racing seasons**
- **Partnering discussions ongoing for OxiDx targeting the Thoroughbred horse racing industry**

Proteomics International Laboratories Ltd (Proteomics International; ASX: PIQ), a pioneer in precision diagnostics, is pleased to announce that its majority owned subsidiary OxiDx Pty Ltd, in collaboration with The University of Western Australia, will today present groundbreaking performance data showing that Thoroughbred horses racing without oxidative stress (as measured by the OxiDx test) were 76% more likely to place and 49% more likely to win than horses with oxidative stress.

Muscle injuries are a major issue in the racing industry, with it being difficult to objectively identify them, resulting in many going undetected<sup>1</sup>. Approximately 85% of Thoroughbreds sustain at least one injury during their two- and three-year-old racing seasons<sup>2</sup>, potentially as a result of undetected muscle injuries.

A study of 75 racehorses over 216 competitive events demonstrated that the absence of oxidative stress was strongly associated with superior racing performance. Using the proprietary OxiDx blood test, individual oxidative-stress baselines were established and monitored daily across the season. Horses racing without oxidative stress resulted in a higher likelihood of winning or placing in the top three (Probability (P) <0.0001), accounting for 88% of top three finishers. These findings strengthen the growing evidence base supporting the OxiDx technology and highlight its potential to enhance performance outcomes and improve animal welfare practices.

Proteomics International Managing Director Dr Richard Lipscombe said, *"These results confirm that the first-in-class OxiDx test delivers a unique insight into the physiological readiness of racehorses. By detecting oxidative stress, trainers are better positioned to optimise race performance while maintaining high standards of horse welfare."*

<sup>1</sup> Diagnosing and managing muscle tears in horses

<sup>2</sup> Animals (2023); doi: 10.3390/ani13030490

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The global Thoroughbred racing industry is worth over A\$400 billion annually, characterised by intense competition and high-performance demands. The Australian racing industry is valued at over \$9 billion, with Australia having more racecourses than any other country in the world, the second-largest number of racehorse starters, and host of the world's richest turf race, The Everest (A\$20 million prize money).

Performance variability and injury remain costly challenges for the industry, with musculoskeletal issues responsible for around half of all lost training and racing days. As leading stables and racing authorities accelerate investment in sports science and precision monitoring, the OxiDx test delivers a breakthrough, data-driven biomarker solution to enhance equine performance, reduce injury risk, and protect valuable racing assets.

The new results are being presented today at the Australian Physiological society (AuPS) Annual Scientific Meeting in Sydney, Australia, 23-26 November 2025.

Previously published results have demonstrated the first-in-class OxiDx blood test can accurately identify and assess recovery from exercise-induced muscle damage in Australian Thoroughbred racehorses<sup>3</sup> [ASX: 14 July] and can also identify and assess recovery from exercise-induced muscle damage in elite marathon runners<sup>4</sup> [ASX: 31 December 2024].

#### **OxiDx commercialisation pathway next steps:**

- OxiDx Pty Ltd is currently in discussions with potential partners to accelerate commercialisation and expand adoption of the OxiDx test in the Thoroughbred horse racing industry both in Australia and overseas. Further updates and launch plans will be provided in due course.
- OxiDx Pty Ltd intends to expand the OxiDx technology to elite human athletes following the equine launch.

#### **Summary of Study**

Presented at the Australian Physiological Society (AuPS) Annual Scientific Meeting, Sydney, Australia, 23-26 November 2025 [copy attached].

Presentation titled: *Stable levels of OxiDx, a biomarker of oxidative stress, is correlated with enhanced performance in Australian Thoroughbred racehorses*

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**Aim:** To assess how the OxiDx test (measuring oxidative stress levels via thiol-oxidised albumin) correlates with race performance in Thoroughbred racehorses.

**Method:** The study followed 75 horses from seven Australian stables comprising 216 total races. Blood samples were analysed using the OxiDx test, a dried blood spot assay for sensitive quantification of thiol-oxidised albumin, from samples collected at baseline (race-fit but unraced), 48hr pre-race, and daily for up to eight days post-race. Baseline levels were measured to determine a cut-off oxidative stress relative change value (RCV) for each horse.

**Results:** Following competition, thiol-oxidised albumin levels increased significantly from baseline at 24hr post-race ( $P < 0.0001$ ) and remained elevated for up to eight days. Prior to their first race, 24% of horses showed oxidative stress, increasing to 53% after three consecutive races. Horses racing without oxidative stress resulted in a higher likelihood of winning or placing in the top three ( $P < 0.0001$ ), accounting for 88% of top three finishers. Horses *without* oxidative stress were 76% more likely to place and 49% more likely to win their race than horses *with* oxidative stress.

#### **Conclusions:**

- Using the OxiDx test, blood samples for determining a horse's level of oxidative stress can be collected in the field in under one minute.
- A substantial proportion of horses raced with oxidative stress, impairing their race performance.
- Racing without oxidative stress resulted in a higher likelihood of winning or placing in the top three.

<sup>3</sup> Veterinary Science and Medicine (2025); doi.org/10.1002/vms3.70487

<sup>4</sup> Physiological Reports: doi.org/10.14814/phy2.70155

The OxiDx test is one of multiple assets in Proteomics International's pipeline of precision diagnostics and represents a substantial commercial opportunity across multiple sports and animal welfare markets.

Authorised by the Board of Proteomics International Laboratories Ltd (ASX: PIQ).

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#### **About OxiDx**

OxiDx Pty Ltd (Perth, Western Australia) is a 66 per cent owned subsidiary of Proteomics International. OxiDx is commercialising technology for measuring oxidative stress developed in collaboration with The University of Western Australia. Oxidative stress is implicated in over 70 health conditions, with levels often reflective of a person or animal's health condition. The patented OxiDx test detects systemic oxidative stress using a precise ratio-metric method to measure protein biomarkers via a simple dried blood sample. Target applications include high-performance athletes and the horse racing industry, where the OxiDx test can be used to assess muscle damage and recovery from exercise.

#### **About Proteomics International Laboratories (PILL) ([www.proteomicsinternational.com](http://www.proteomicsinternational.com))**

Proteomics International (Perth, Western Australia) is a wholly owned subsidiary and trading name of PILL (ASX: PIQ), a medical technology company at the forefront of precision diagnostics and bio-analytical services. The Company specialises in the area of proteomics – the industrial scale study of the structure and function of proteins. Proteomics International's mission is to improve the quality of lives by the creation and application of innovative tools that enable the improved treatment of disease.

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# Stable levels of OxiDx, a biomarker of oxidative stress, is correlated with enhanced performance in Australian Thoroughbred racehorses

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## Introduction

Intensive physical exercise can lead to exercise induced muscle damage (EIMD).

Insufficient recovery from EIMD:

- Can cause underperformance and
- Increases the risk of serious injury

We have previously shown that the level of thiol-oxidised albumin, a biomarker of oxidative stress linked to EIMD (Fig. 1A), can be used to track recovery in human athletes and Thoroughbred horses (Fig. 1B).

Thoroughbred horses compete in consecutive race events with minimal periods of rest, so there is potential for horses to enter races with elevated oxidative stress and EIMD.

We tested Thoroughbred horses to identify if:

1. There was elevated oxidative stress prior to a race and
2. Whether oxidative stress impacted race performance

## Methods

Seventy-five clinically healthy horses (age 2–8 years) from seven Australian stables raced in 216 events, consisting of 150 official races and 66 trial races. Blood samples for thiol-oxidised albumin (Fig. 2) were collected at baseline, when horses were race-fit but had not yet raced, 48 hours pre-race, and each day for up to 8 days post-race. Baseline levels of thiol-oxidised albumin were used to calculate an individual cut-off value for each horse (80% confidence, doi: [10.1515/CCLM.2011.733](https://doi.org/10.1515/CCLM.2011.733)). Values above the cut-off were indicative of oxidative stress.

## Results

At 48 hours pre-race, the average level of thiol-oxidized albumin ( $17.1\% \pm 0.48\%$ , 95% CI) was significantly higher than at baseline ( $15.7\% \pm 0.35\%$ , 95% CI).

24% of horses exhibited oxidative stress prior to their first race, rising to 53% for horses who completed three consecutive races (Fig. 3A).

Only 12% of top three placed horses showed oxidative stress, compared with 51% of un-placed horses.

Horses with pre-race oxidative stress showed signs of impaired performance. The level of oxidative stress correlated with some performance outcomes (Table 2).

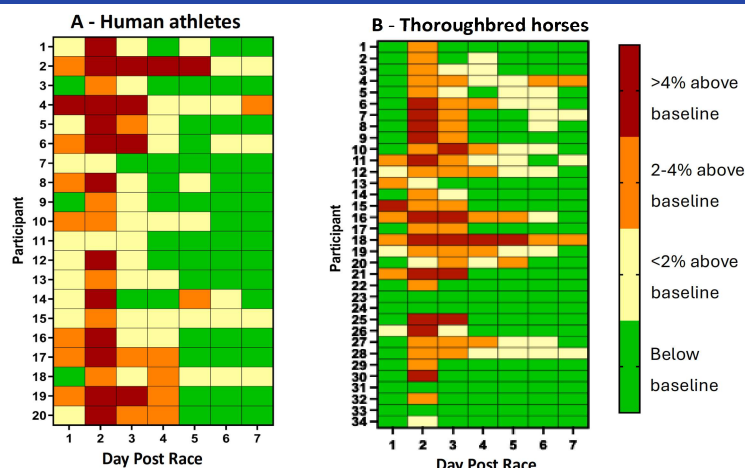
Horses racing without oxidative stress were 76% more likely to finish in the top three and 49% more likely to win the race.

Table 2. Correlation between the change in thiol-oxidised albumin from RCV against outcomes related to race performance. \* $p < 0.05$ .

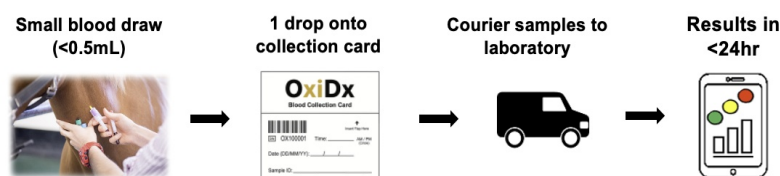
Performance Outcome	Correlation Coefficient	P value
Finishing position	0.20	0.0001*
Perceived rating of performance	-0.16	0.015*

## Conclusions

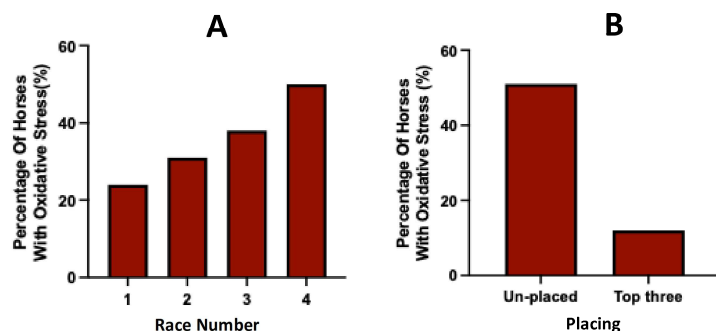
1. A substantial proportion of horses raced with oxidative stress, impairing their race performance.
2. The proportion of horses racing with oxidative stress increased with each consecutive race.
3. Racing without oxidative stress resulted in a higher likelihood of winning or placing in the top three.



**Figure 1.** Levels of thiol-oxidized albumin above or below each participant's baseline. In human athletes (A), a marathon race induced EIMD, and we linked increased thiol-oxidised albumin to decreased muscle force (doi: [10.14814/phy2.70155](https://doi.org/10.14814/phy2.70155)). In horses (B), a field track race was used to induce oxidative stress (doi: [10.1002/vms3.70487](https://doi.org/10.1002/vms3.70487)).



**Figure 2.** The OxiDx test is a field ready, low volume, dried blood spot method that permits sample collection in under 1 minute. One drop of blood is deposited onto the OxiDx collection card which stabilises the blood at ambient temperature. Streamlined capillary electrophoresis laboratory analysis permits 24 hours sample turnaround.



**Figure 3.** The percentage of horses with oxidative stress prior to each race (A), races where horses placed in the top three or outside the top three (B).  $n = 75, 60, 35$  and  $23$  horses for race 1, 2, 3 and 4 (A) and  $125$  and  $91$  horses for un-placed and top three (B).

## Applications

Routine testing for the level of thiol-oxidised albumin in individual human and animal athletes could be useful to:

1. Optimise training volume + intensity



2. Optimise competition schedules



1. Enhance competition performance



2. Improve welfare and longevity



Interested in learning more about OxiDx?

