

  
charles river

# Endosafe<sup>®</sup> Trillium<sup>®</sup>

A Recombinant Cascade Reagent (rCR)



# Introducing **Endosafe<sup>®</sup>** **Trillium<sup>®</sup>**

## A Recombinant Cascade Reagent (rCR)

Keeping pace in an industry focused on revolutionizing science and innovation, we've evolved and refined the next addition to our bacterial endotoxin detection portfolio with Endosafe Trillium, a recombinant cascade reagent assay.

Built on sound science and quality standards, Trillium detects and quantifies natural environmental endotoxins by simulating the LAL enzymatic cascade through an optimized formulation and composition of three critical recombinant proteins. This proprietary matrix demonstrates assay superiority in accuracy, comparability, and robustness compared to other recombinant endotoxin detection technologies and our primary validation data supports the claim of equivalency to LAL.



# An Advantageous Alternative

## Built on conscientious and deliberate science

Trillium is as reliable as it is easy to implement. Virtually identical in compatibility and preparation to our traditional Kinetic Chromogenic LAL reagents, it allows you to transform your endotoxin testing program seamlessly.



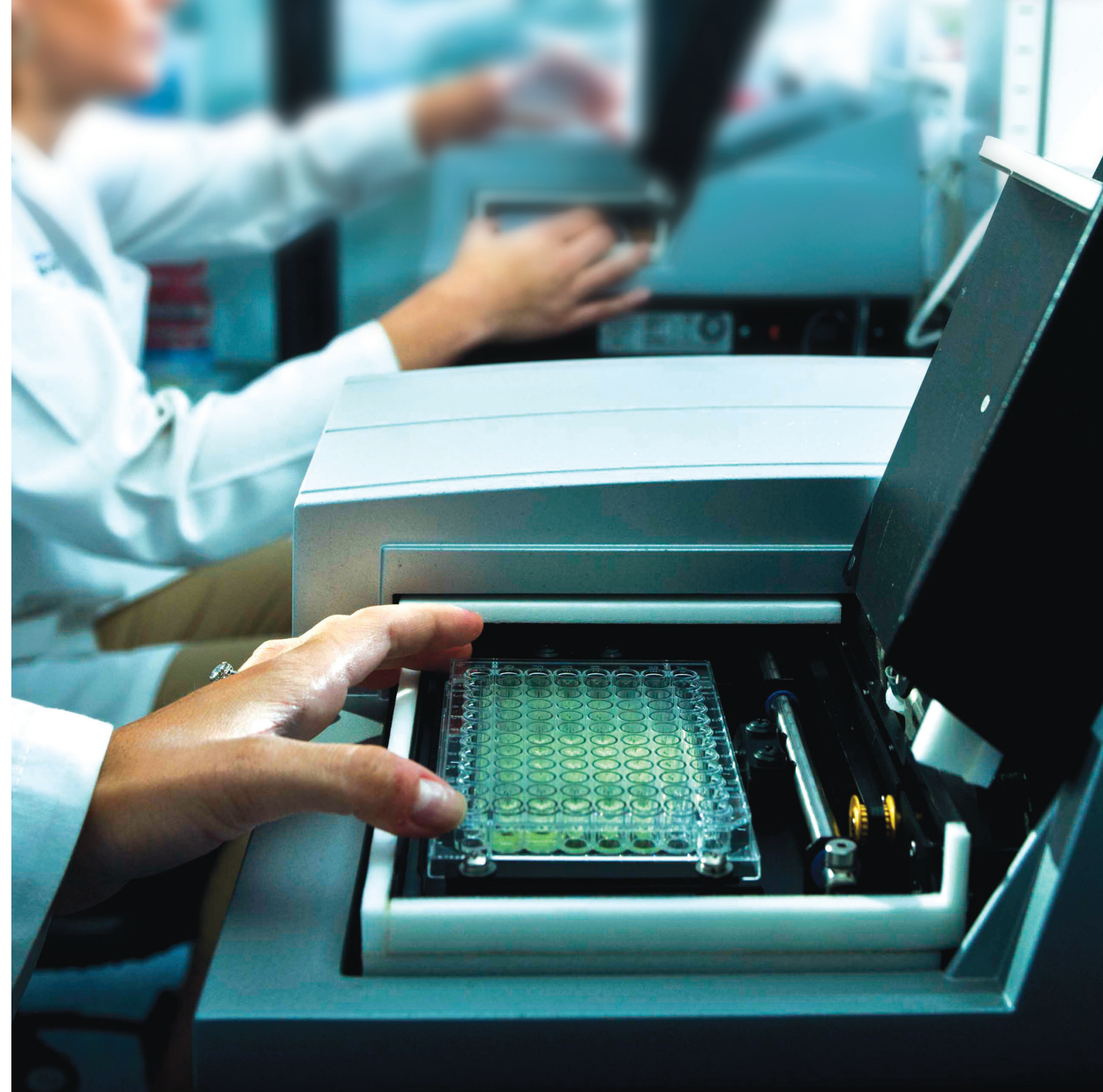
### Animal-free. Benefit-full.

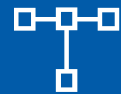
- Kinetic chromogenic method
- Compatible with existing plate readers
- Supported by Endosafe® Endoscan-V software™
- Avoids additional capital investments
- Fully supports 3Rs



### Exceptional sensitivity. Extraordinary ease of use.

- 0.001–100 EU/mL quantitative range
- Reconstitute with LAL reagent water
- Stable for 4 Hours at 2–8° C
- Eliminates the potential for 1,3-β-D-glucans, reducing the risk of false positives
- Pack of 6, 32-test vials





### Complete Cascade Confidence

Understanding formulation and composition is imperative to recovery of natural environmental endotoxin. Trillium utilizes a 3-Factor enzymatic cascade formulation that mimics the same reaction as the traditional LAL cascade, where recombinant Factor C, recombinant Factor B, and recombinant pro-clotting enzyme are present. A recombinant cascade that consists of the 3 proteins, allows use of a kinetic absorbance method as the complete enzymatic cascade provides the natural amplification for the reaction.



### Unmatched Validation and Implementation Support

We understand that adopting a new testing method can be challenging, that's why we provide comprehensive validation protocols and implementation support as part of our validation package. Our industry-proven technical teams have unique experience in successfully validating alternative microbiological methods. They possess over 40 years of endotoxin testing, troubleshooting, method development experience, and will be by your side throughout the implementation process.

# 3-Factor Enzymatic Cascade



Lipopolysaccharide  
(endotoxin)



Recombinant  
Factor C (rFC)

Activated Recombinant  
Factor C



Recombinant  
Factor B (rFB)

Activated Recombinant  
Factor B



Recombinant Pro-clotting  
Enzyme (rPCE)

Activated Recombinant  
Pro-clotting Enzyme (rPCE)



Chromogenic Substrate

PNA + Color Change  
(Yellow)




# Sustainable by Design, with Flexibility in Mind.

**Rapid. Simple. Seamless.**

Twenty years ago, our scientists pursued a vision of streamlining benches that were cluttered with vials and pipettes, with a modern, simplified method to eliminate the labor-intensive process of testing for the presence of endotoxin. Our customers yearned for a more robust, sustainable assay that delivered faster quantitative results in real-time.

Our solution was the FDA-Licensed Endosafe® LAL cartridge, a novel technology that eliminates much of the raw material, variables, and time-consuming preparation required of traditional LAL methods.



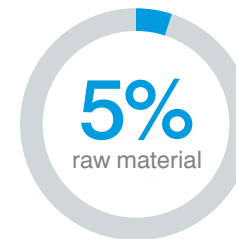
Elevating that vision, we've reimagined the next iteration of this technology by fusing Trillium into our flagship cartridge technology to be fully aligned and integrated with our current suite of Endosafe instrumentation and software.

# Scientifically Charged. Environmentally Conscious.

Join our mission to lead the industry in horseshoe crab sustainability efforts

One area where sustainability and innovation intersect is endotoxin testing. Endotoxin testing methods have been influencing the 3Rs for over 60 years, with the goal to replace, reduce, or refine tests that use an animal model as an *in vivo* assay. Advancements in technology and scientific research have unlocked new possibilities for creating sustainable alternatives to animal-derived products.

In addition to expanding our endotoxin detection portfolio, Trillium rCR allows us to further optimize our resources and continue our journey to reduce our reliance on the horseshoe crab. By partnering with us, you join our mission to lead the industry in horseshoe crab sustainability efforts. We are dedicated to constantly identifying technologies that reduce or replace animal use while ensuring patient safety. Implementing either our LAL cartridge technology or Trillium rCR, you too can strengthen your commitment to sustainability while achieving reliable and precise endotoxin results.



For over 20 years, our innovative FDA-licensed Endosafe LAL cartridge technology has embodied our commitment to the 3Rs, as it utilizes only 5% of the raw material from the Atlantic horseshoe crab when compared to traditional LAL plate methods, while remaining compendial and ensuring product safety.

# Embracing the 4Rs

## Animal-free bacterial endotoxin testing

Today, organizations worldwide are pursuing non-animal options to ensure sustainable supply chains and business operations, while affirming their commitment to corporate citizenship.

We mirror this commitment having recently reframed the 3Rs and added a fourth R for “Responsibility” to demonstrate our ongoing commitment to animal welfare, as we partner with you in ensuring safety and sustainability in the lab, for patients, and for the environment.

4Rs

Replacement | Reduction | Refinement | Responsibility

Confidence and safety in product manufacturing while simultaneously strengthening a united commitment to sustainability initiatives

# Our commitment to conservation doesn't stop

## Protecting the Atlantic horseshoe crab

We have a responsibility to preserve, protect, and live harmoniously with the animals that share our planet.



As your trusted partner, we shoulder the responsibility of providing sustainable solutions that align with global initiatives and bolster your own sustainability endeavors. That's why we have developed a comprehensive portfolio of bacterial endotoxin testing solutions that serve your specific needs while simultaneously embracing patient safety and a sustainable future. With the release of Trillium, we'll continue our advocacy and protection of Limulus species.



To learn more about how our portfolio can meet your needs and help you drive your sustainability program, visit [www.criver.com/Trillium](http://www.criver.com/Trillium)

## Reducing Horseshoe Crab Crude Intensity

Gel-Clot LAL



**0%**  
reduction

Kinetic Turbidimetric LAL

Zero reduction in horseshoe crab blood from Gel-Clot

**54%**  
reduction

Kinetic Chromogenic LAL

54% reduction in horseshoe crab blood from Gel-Clot

**95%**  
reduction

LAL Cartridge Technology

95% reduction in horseshoe crab blood from Gel-Clot



**100%**  
reduction

Recombinant Cascade Reagent (rCR)

100% horseshoe crab blood free

# Contact and Ordering Information

Product	Product Description	Code
Endosafe Trillium rCR	1.7 mL vial; 32 tests per vial	RCRV3032
Alternative Validation Support	Vial Primary Validation	VALRCRV
Alternative Validation Support	Trillium rCR Vial Interference Screen	TSRCRV3000



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🌐 [www.criver.com/Trillium](http://www.criver.com/Trillium)