

Updated on April 2025

### Resources on Monocyte Activation Test

- HSI Webinar on MAT from the Italian Institute of Health: <https://youtu.be/jxy7FsMOfNo>
- Latest event organized by EDQM (February 2023). Presentations and training material. **The future of pyrogenicity testing. Phasing out the rabbit pyrogen test:** <https://www.edqm.eu/en/-/joint-edqm-epaa-event-the-future-of-pyrogenicity-testing-phasing-out-the-rabbit-pyrogen-test>

#### Key publications:

- **Cirefice G**, et al. The future of pyrogenicity testing: Phasing out the rabbit pyrogen test. A meeting report. *Biologicals* 84 (2023) 101702.
- **Brown J**, et al. Using the monocyte activation test as a stand-alone release test for medical devices. *ALTEX*. 2021;38(1):151-156.
- **Hartung T**, Pyrogen Testing Revisited on Occasion of the 25th Anniversary of the Whole Blood Monocyte Activation Test *ALTEX* 38(1), 003-019. doi:10.14573/altex.2101051
- **Etna et al.** Optimization of the Monocyte-Activation-Test for Evaluating Pyrogenicity of Tick-Borne Encephalitis Virus Vaccine. 2020. *ALTEX*, 2020.
- **Valentini et al.** 2020. Monocyte-activation test to reliably measure the pyrogenic content of a vaccine: An in vitro pyrogen test to overcome in vivo limitations. *Vaccine* Volume 37, <https://doi.org/10.1016/j.vaccine.2018.10.082>
- **Studholme et al.** 2019. Evaluation of the monocyte activation test for the safety testing of meningococcal B vaccine Bexsero: A collaborative study. *Vaccine* 37 (2019) 3761–3769.
- **da Silva C et al.** 2016. Applicability of the monocyte activation test (MAT) for hyperimmune sera in the routine of the quality control laboratory: comparison with the rabbit pyrogen test (RPT). *Toxicol In Vitro*. 32:70-75.
- **Vipond C et al.** 2015. Limitations of the Rabbit Pyrogen Test for Assessing Meningococcal OMV Based Vaccines. *Altex* 33(1), 2016. *Altex* 33(1), 2016
- **Koryakina et al.** 2014. Cryopreservation of human monocytes for pharmacopeial monocyte activation test. *J Immunol Methods*. 405:181-191.

| MAT Method/Kit                                | Kit Description  | Supplier | Supplier website  |
|---|--|----------|---|
| PyroCellTM Monocyte Activation Test (MAT) Kit | 3 vials pooled PBMC (pMAT cells, 4 donors) as well as 3 vials of Cell Culture Medium Supplement for 3 x 96-well ELISA plates | Lonza    | <a href="https://bioscience.lonza.com/">https://bioscience.lonza.com/</a> |

|   |  |                                 |   |
|---|--|---------------------------------|---|
| PyroCell™ MAT System, IL-6                    | It combines the PyroCell™ MAT Kit and the PeliKine compact human IL-6 ELISA kit. It contains 3 vials of cryopreserved, pooled PBMC (pMAT Cells), 3 vials of MAT Culture Medium Supplement, the PeliKine compact human IL-6 kit and the PeliKine tool set 1 sufficient for 288 test (3 ELISA plate).            | Lonza                           | <a href="https://bioscience.lonza.com/">https://bioscience.lonza.com/</a>   |
|   |  | Saquin (partnership with Lonza) | <a href="https://www.sanquin.org/products-and-services/monocyte-activation-test/mat-kits">https://www.sanquin.org/products-and-services/monocyte-activation-test/mat-kits</a> |
| CTL-MAT kit                                   | Pooled PBMC, 96-Well Microplate, Media A and B, EDQM Endotoxin Standard, 2 x Non-Endotoxins, Human IL-6 ELISA Kit  | MAT Biotech                     | <a href="https://www.mat-biotech.com/">https://www.mat-biotech.com/</a>   |
| PyroMAT®                                      | The kit contains reagents for the incubation with the cells and the interleukin IL-6 ELISA. Note: the PyroMAT™ cells are not included and should be ordered separately.  | Sigma Aldrich - Merck           | <a href="https://www.sigmaaldrich.com/BR/pt">https://www.sigmaaldrich.com/BR/pt</a>   |
| MATR Kit (+MATR Cells)                        | Cryopreserved peripheral blood mononuclear cells; ELISA plates; Cell culture medium; Fetal Bovine Serum; Broad range IL-6 ELISA kit; IL-6 standard; LAL water; 3 Reference endotoxin standard and NEP controls   | MAT Research                    | <a href="https://www.matresearch.com/">https://www.matresearch.com/</a>   |
| Pyrocell Monocyte Activation Test (MAT) Assay | Cryopreserved preparation of Peripheral Blood Mononuclear Cells (PBMC) pooled from equal amounts of four human blood donations, and an optimized MAT Culture Medium Supplement. The PyroCell™ MAT Kit has been validated with the PeliKine compact human IL-6 ELISA kit, ensuring robust and reliable results. | BioNordica                      | <a href="https://bionordica.no/en">https://bionordica.no/en</a>   |

|                                |  |                         |   |
|--------------------------------|--|-------------------------|---|
| Mylc ELISA(human IL-6) Kit     | A test substance is added to the Mylc cells, and the produced transmitter (IL-6) is quantified. The intensity of the stimulation by the test substance can be evaluated numerically, which enables judgment of the function.   | Mycan Technologies inc. | <a href="https://www.micantech.com/en/products/jp-products-evaluationkit/">https://www.micantech.com/en/products/jp-products-evaluationkit/</a>   |
| instaCELL® Pyrogen Assay Kits  | THP-1 macrophage Assay Ready Cells<br>Assay Buffer A, Recovery Buffer A<br>Coating Buffer & ELISA Buffer<br>TMB Solution, Streptavidin-HRP<br>Detection & Capture Antibody<br>BRP-Standard<br>96-well plates   | AcCELLerate             | <a href="https://www.accelerate.me/">https://www.accelerate.me/</a>   |
| MAT Kit                        | Cryopreserved pooled PBMC, IL-6 ELISA, reference standards, reagents and protocols. All component of the test system are fine-tuned for optimal performance in MAT and are certified pyrogen free.   | CTL-MAT                 | <a href="https://ctlmat.com/">https://ctlmat.com/</a>   |
| LumiMAT™ Pyrogen Detection Kit | <ul style="list-style-type: none"> <li>• Assay with reporter NOMO-1 cells</li> <li>• Rapid testing (5 hours)</li> <li>• Convenient reporter assay</li> <li>• Only add luminescent substrate to the plate after incubation</li> <li>• Stable reporter cell line</li> <li>• Cell lines stably expressing reporter genes</li> <li>• High reproducibility with less lot-to-lot variation</li> <li>• Stable supply from master cell bank</li> </ul> | Fujifilm Wako Chemical  | <a href="https://www.wakopyrostar.com/brands/wakopyrostar.com/brands/wakopyrostar.com/product/lumimat-pyrogen-detection-kit/">https://www.wakopyrostar.com/brands/wakopyrostar.com/product/lumimat-pyrogen-detection-kit/</a> |

## Resources on recombinant Factor C

- EDQM Webinar: Using recombinant factor C for bacterial endotoxin testing in the European Pharmacopoeia: how far have we come, how far have we to go? Recording and Materials: <https://www.edqm.eu/en/-/webinar-on-using-recombinant-factor-c-for-bacterial-endotoxin-testing-in-the-european-pharmacopoeia-how-far-have-we-come-how-far-have-we-to-go->

### Key publications:

- Marius et al. 2020. Comparison of bacterial endotoxin testing methods in purified T pharmaceutical water matrices. *Biologicals*.
- Piehler et al. 2020. Comparison of LAL and FC assays Participation in a Proficiency Test Program between 2014 and 2019. *Microorganisms*.
- Marius et al. 2020. Comparison of LAL and recombinant Factor C assays for endotoxin detection in four human vaccines with complex matrices. *J Pharm Sci Technol*.
- Bolden, Smith, 2017. Application of Recombinant Factor C Reagent for the Detection of Bacterial Endotoxins in Pharmaceutical Products. *J Pharm Sci Technol*.

| Kit   | Supplier                          | Supplier website  |
|---|-----------------------------------|---|
| ENDONEXT™<br>(recombinant Factor C)                                       | bioMérieux<br>/Global             | <a href="https://www.biomerieux.com/us/en/our-offer/products/endonext-endotoxin-detection-assays.html">https://www.biomerieux.com/us/en/our-offer/products/endonext-endotoxin-detection-assays.html</a>   |
| PyroGene® rFC Assay<br>(recombinant Factor C)                             | Lonza /Global                     | <a href="https://bioscience.lonza.com/">https://bioscience.lonza.com/</a>   |
| Bioendo™ rFC Endotoxin Test Kit (Recombinant Factor C Fluorometric Assay) | Bioendo/China                     | <a href="https://www.bioendo.com/recombinant-factor-c-fluorometric-assay-product/?keyword=rfc%20endotoxin%20assay&amp;82E75F5AF5D2D01C&amp;matchtype=b&amp;gclid=CjwKCAjw2K6lBhBXEiwA5RjtCXqQODuTI904u6XE2E-n8amiVjancGZa8QvxEO1PPJMHzny6G_sm1hoCa1IQAvD_BwE">https://www.bioendo.com/recombinant-factor-c-fluorometric-assay-product/?keyword=rfc%20endotoxin%20assay&amp;82E75F5AF5D2D01C&amp;matchtype=b&amp;gclid=CjwKCAjw2K6lBhBXEiwA5RjtCXqQODuTI904u6XE2E-n8amiVjancGZa8QvxEO1PPJMHzny6G_sm1hoCa1IQAvD_BwE</a> |
| PyroSMART NextGen (rCR)   | Associate of Cape Code/Global     | <a href="https://www.acciusa.com/products-and-services/bet-products/recombinant-reagent">https://www.acciusa.com/products-and-services/bet-products/recombinant-reagent</a>   |
| Endosafe® Trillium™ Recombinant Cascade Reagent (rCR)                     | Charles River Laboratories/Global | <a href="https://www.criver.com/products-services/qc-microbial-solutions/endotoxin-testing/endosafe-trillium-recombinant-cascade-reagent?region=27">https://www.criver.com/products-services/qc-microbial-solutions/endotoxin-testing/endosafe-trillium-recombinant-cascade-reagent?region=27</a>   |
| PYROSTAR™ Neo (rCR)   | FujiFilm Wako Chemicals USA       | <a href="https://www.wakopyrostar.com/brands/wako/product/pyrostar-neo/">https://www.wakopyrostar.com/brands/wako/product/pyrostar-neo/</a>   |