



International Alliance for
Biological Standardization

**Animal Testing Replacement for Vaccines.
A One Health View: Global Outlook and Future Strategy**
December 2-4, 2025
Bangkok, Thailand

Safety tests for vaccines; Strategies to remove and replace animal tests in the European Pharmacopoeia (Ph. Eur.)

Dr. Catherine Milne, Head of Networks Division, ICND, European Directorate for the Quality of Medicines and Healthcare, Council of Europe

Safety is a key quality parameter for vaccines for human and veterinary use. During regular production and quality control, tests are put in place to ensure that each batch is as safe and efficacious as those used in the clinical/field trials and approved. Traditionally many of these tests have involved the use of animals however it is recognised that in vitro tests can provide a scientific advantage for the consistency control in place of the in vivo assays which are generally more variable. Numerous in vitro opportunities are now available. When assessing the possibilities to replace or remove animal tests for safety, a holistic approach that considers evidence from the product development phase and evaluates the whole production and control process is recommended. Successful strategies depend on well characterised and standardised products and production processes and use of appropriate, validated, added-value quality control tests applied at the most appropriate stage of production. A careful review can identify tests which may be replaced with an in vitro alternative, removed due to redundancy in the testing scheme or removed after re-evaluation of the scientific added value in the current context. The presentation reviews different kinds of safety tests that may be used to assess vaccines and how the European Pharmacopoeia (Ph. Eur.) has evaluated the testing strategies for different products and tests to apply these principles. Examples include removal of general safety tests like the abnormal toxicity test and the target animal batch safety test and removal of the rabbit pyrogen test as part of the new pyrogen strategy outlined in Ph. Eur. chapter 5.1.13, in force from 01/07/2025. Other examples include toxicity testing for diphtheria, tetanus, acellular pertussis vaccines for human use and clostridial vaccines for veterinary use, residual live virus tests for veterinary vaccines and use of next generation sequencing for extraneous agents testing, which is facilitated by the new Ph. Eur. general chapter 2.6.41 *High throughput sequencing for the detection of viral extraneous agents*, as well as possibilities to use HTS to assess genomic consistency for assessment of neurovirulence. All decisions for change are based on sound scientific principles and consultation and EDQM is committed to continue to assess opportunities for advances in 3Rs and improved analytical tools.

<https://www.edqm.eu/en/alternatives-to-animal-testing>

<https://www.edqm.eu/en/-/ph.-eur.-bids-adieu-to-rabbit-pyrogen-test-in-its-monographs>

<https://www.edqm.eu/en/-/proceedings-of-workshop-on-alternatives-to-animal-testing-in-quality-control-of-veterinary-vaccines-now-available>

<https://www.edqm.eu/en/-/ph.-eur.-to-replace-histamine-sensitisation-test-hist-for-residual-pertussis-toxin-testing>

<https://www.edqm.eu/en/-/binacle-assay-for-tetanus-neurotoxin-outcomes-of-project-bsp136-2>

<https://www.edqm.eu/en/-/epc-adopts-cutting-edge-hts-chapter-to-enhance-viral-contaminant-detection-in-biological-products>

