

Comment

Phasing in Human-Relevant Science: Why the UK's Roadmap Matters – And How to Make It Work

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The UK has just put a stake in the ground on phasing out animal testing in science – and, crucially, it has done so with dates, governance, and a validation engine rather than slogans. The government's new strategy¹ names specific regulatory endpoints to retire, sets up national capacity to validate and accept alternatives, and funds the data infrastructure and AI plumbing that modern science runs on. If executed with urgency and international alignment, this could make the UK a first-mover for acceptance of microphysiological systems, organoids, and AI-enabled toxicology, improving human relevance while reducing animal use.

The plan is highly concrete about near-term replacements. By the end of 2026, the UK aims to satisfy regulatory requirements for skin and eye irritation and for skin sensitization exclusively with validated non-animal methods – drawing on OECD TG 439, TG 442C/D/E, and TG 497 for defined approaches. The same horizon is given for the obvious but long-awaited step of allowing first-in-human submissions for biologicals without animal studies in cases where no pharmacologically relevant animal species exist – moving a practice already used case-by-case into guidance. And by 2027, pharmacopoeial adventitious agent testing, a quality control step to detect contaminants in biological products such as vaccines and biotherapeutics, is slated to shift fully to DNA-based lab methods (PCR/NGS), while the long-criticized botulinum toxin LD₅₀ mouse test is expected to end for routine batch potency testing. Together, these intentions signal a deliberate pivot from “validation in theory” to “replacement in practice.”

Nowhere is this shift more emblematic than pyrogen testing, the detection of fever-causing substances in medical products like injectable drugs and vaccines. With the European Pharmacopoeia removing the rabbit pyrogen test (RPT) from all official standards as of July 2025 and the UK explicitly targeting the exclusive use of validated alternatives by year's end, the monocyte activation test (MAT) has become a model for replacing legacy animal tests with human cell-based assays. As principle investigator (PI) of the respective international validation study and then former head of ECVAM, I helped launch, steer and foster the uptake of the MAT

– work that has already driven major reductions in rabbit use in Europe and improved detection of non-endotoxin pyrogens that the *Limulus* amoebocyte lysate (LAL) assay can miss (Hartung, 2021). Embedding MAT across UK guidance completes a three-decade scientific and regulatory journey and demonstrates how the new roadmap can deliver measurable animal-free wins.

The roadmap also tackles higher-severity animal tests and high-volume practices. The Home Office will stop granting licences for the forced swim test as a model for depression; the three currently active licences will conclude by 2028 while alternatives are developed and validated. Acute fish toxicity testing under UK REACH is targeted for replacement by 2028 using OECD-recognized non-animal approaches (e.g., RTgill-W1 and embryo tests) combined via integrated approaches to testing and assessment (IATA). And on the pharmaceutical side, the goal is a reduction of at least 35% by 2030 of dedicated pharmacokinetic studies on dogs and non-human primates, shifting to integrated study designs and *in vitro* and *in silico* methods. These are framed within a sensible “three basket” prioritization that distinguishes rapid, medium-term, and long-term opportunities.

What makes this endeavor more than a wish list are the enablers. The UK will set up a UK Centre for the Validation of Alternative Methods (UKCVAM) in a “hub-and-spokes model” to coordinate ring trials, define contexts-of-use, and publish a list of accepted methods and a queue of validation priorities starting in 2026. A hub-and-spokes model is a network design where a central “hub” sets standards, coordinates work, and aggregates data, while distributed “spokes” (sites/labs/teams) do the hands-on execution and feed results back to the hub. Information, samples, and protocols flow outward from the hub (methods, reference materials, training) and inward from the spokes (data, quality control metrics, case studies), so the system scales without losing consistency. In parallel, a preclinical translational models hub will concentrate data, technology, and expertise. Training programs for developers and assessors, pre-submission scientific advice mechanisms, and a public key performance indicator (KPI) dashboard are built in

¹ <https://www.gov.uk/government/publications/replacing-animals-in-science-strategy/replacing-animals-in-science-a-strategy-to-support-the-development-validation-and-uptake-of-alternative-methods>

² <https://www.gov.uk/government/news/animal-testing-to-be-phased-out-faster-as-uk-unveils-roadmap-for-alternative-methods>



from the start. Funding is real: the accompanying press release² confirms £60 million to establish the hubs/validation capacity and a further £15.9 million for “human *in vitro* disease models” across liver, brain, cancer, pain, and vasculature.

Two choices deserve special praise. First, the plan invests in data infrastructure – curation, sharing frameworks, and regulatory sandboxes – to ensure that defined approaches and probabilistic decisions are fed by high-quality, human-relevant evidence rather than isolated study results. Second, it explicitly orients UKCVAM and its priorities toward international acceptance, recognizing that mutual acceptance at the Organisation for Economic Co-operation and Development (OECD) / International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH) / International Cooperation on Harmonisation of Technical Requirements for Registration of Veterinary Medicinal Products (VICH) is key to preventing the scenario of replacing animal tests at home but still being required to conduct them on the same products for export. That is the way to go if the goal is to reduce animal use globally while warranting safe access to medicines and chemicals.

As with any strategy, its delivery will decide its success. The central risk is capacity: Validation is a grind, and without sustained multi-year funding and a standing network of Good Laboratory Practice (GLP)-capable labs, UKCVAM could become a bottleneck rather than a flywheel. The government can mitigate this risk by publishing its first “accepted methods” list and validation queue quickly, awarding studies against those priorities, and releasing anonymized case studies of new approach method (NAM)-heavy submissions to set a precedent. Industry and academia, in turn, should pre-register regulatory pilots (e.g., single-species chronic toxicity or NAM-only adventitious-agent assays) and obtain early scientific advice to de-risk first-movers. And all parties should share legacy toxicity, pharmacokinetics, QT prolongation, and im-

munogenicity data under safe harbor frameworks to strengthen the development of AI-assisted defined approaches.

The UK is not moving in a vacuum. In April 2025, the United States synchronized the Food and Drug Administration (FDA), Environmental Protection Agency (EPA), and National Institutes of Health (NIH) to accelerate NAMs, including an FDA roadmap for monoclonal antibody development without routine animal testing and NIH’s creation of the Office of Research Innovation, Validation, and Application (ORIVA) to drive validation and uptake (Hartung, 2025). In recent commentaries^{3,4} I argued that the EU’s methodical but slow process towards phasing out animal testing in chemical risk assessment risks being outpaced unless it pairs its roadmap with deadlines, validation capacity, and harmonized acceptance. In all, the UK strategy looks like a credible bridge between the US’s fast-moving implementation and the EU’s pending roadmap.

The bottom line is straightforward. With this roadmap, the UK has moved the conversation from “if” to “how fast.” It names near-term endpoints including those that should never have required animals in the first place, builds the national capacity to validate what comes next, and funds the data backbone without which AI and organs-on-chip would remain lab curiosities. If the UK now execute – method by method, dossier by dossier, and in lockstep with OECD/ICH/VICH – it can pilot a transatlantic shift where better human-relevant evidence replaces tradition, not safety.

References

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- Hartung, T. (2025) The turning point: April 2025 marks historic shift in US animal testing policy. *ALTEX* 42, 536-537. doi:10.14573/altex.2504301

³ <https://policylabs.frontiersin.org/content/commentary-recommendations-for-the-eu-roadmap-to-accelerate-the-transition-towards-phasing-out-animal-testing-for-chemical-safety-assessments>

⁴ <https://policylabs.frontiersin.org/content/commentary-roadmap-to-reduce-animal-testing>