# THE INVALIDITY OF THE FORCED SWIM TEST

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PETA
People for the Ethical Treatment of Animals

# SUMMARY

The forced swim test (FST) involves placing a small animal in a situation where they fear drowning and using measurements of their behavior to make misguided assumptions about the animal's mood or the potential of compounds to effectively treat human depression. The test is based on false assumptions, is not required, produces unreliable results, ignores important biochemical realities, is subject to experimental confounds, impedes exploration of human-relevant models, and is cruel to animals. Companies, universities, funding bodies, and legislators are increasingly ending their use and support of the FST. However, the use of this test is still widely reported in scientific literature. This report details the myriad problems with the FST and provides stakeholders with recommendations for ending its use.

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## Development of the forced swim test

The FST—also called the Porsolt swim test, forced swimming test, or forced swim stress—was devised and popularized in 1977 by Roger D. Porsolt as a potential method for screening antidepressant drugs. During this test, a small animal, typically a rat or mouse, is placed in a container of water with no way to escape or place to rest out of the water. Naturally, the animal will spend some time swimming and trying to escape the stressful situation but will eventually become immobile and float. The experimenter records the time that the animal spends swimming and the time that they spend floating in the water. Sometimes, the escape behavior is divided into two categories: climbing, in which the rodent attempts to climb up the sides of the container, and swimming, in which the rodent typically swims around but doesn't try to climb out of the container.

The tail suspension test (TST) is a similar assay that operates on analogous principles. An animal (typically a mouse) is held upside down and affixed by the tail to a stationary bar or other object using a piece of tape. For a while, the mouse will struggle and try to correct this frightening and uncomfortable position but eventually becomes immobile. The time spent struggling vs. immobile is recorded.

Porsolt found that when an experimenter acutely administers a commonly used antidepressant drug to the animal prior to the FST or TST, they may swim (or struggle) for longer and spend less time floating (or remaining still) [1,2]. This observation was interpreted to mean that longer swimming times indicate a less "depressed" animal, a supposed state relieved by administration of the antidepressant, which they asserted caused the behavior change. Animals who spent more time immobile were thought to be in "despair," as if they had "given up" by ceasing movement. However, this interpretation is incorrect for several reasons.

YouTube/Pablo Maria Peralta Lorca

YouTube/charcoalnih

Obtained by PETA via FOIA

## Is immobility a learned behavior?

Evidence suggests that immobility in the FST may be a learned or adaptive behavior, not one representing an internal state of despair. In some FST protocols, typically ones involving rats, the same animal is made to participate in the test more than once, usually before and after administration of a particular substance, so that the animal serves as their own control. In this case, immobility becomes a learned behavior. De Pablo *et al*. demonstrated that rats generally show less mobility on the second testing day than on the first day [3]. When a group of rats was administered anisomycin, a substance known to disrupt memory consolidation, they stayed more active on the second day of the test than rats who had not been given the drug, meaning that disrupting the learning process affected behavior during the FST. The untreated rats may have learned that there was no way to escape their situation and that they would eventually be removed from the water by the experimenter, information that the anisomycin-treated rats did not learn as readily. The anisomycin did not affect the rats' behavior during the first day of the test.

Proponents of the idea that FST immobility is a reflection of behavioral despair equate the behavior to what is observed in learned helplessness paradigms [4]. The classic learned helplessness experiment involves exposing an animal to a series of inescapable shocks. At first, the animal actively looks for ways to escape the shocks. Over time, they exhibit fewer or no attempts to escape, even when provided with the means to do so. Experimenters say that these animals have "given up" and resigned themselves to the fate of being shocked—that they've supposedly learned to be helpless.

When the same animal is subjected to the FST more than once, it has been proposed that the initial exposure to the testing situation acts as a stressor, and that increased immobility on later testing days reflects a sort of learned helplessness caused by the inescapable FST. However, experiments by O'Neil and Valentino showed that prior exposure to the FST had no effect on behavior in other stress paradigms, such as inescapable shock, and that allowing rats a means of escaping from the water container during the first FST didn't affect their behavior during subsequent exposures [5]. Animals were still more immobile on later days—an observation that is inconsistent with learned helplessness. This further demonstrates that immobility in the FST may just as easily be interpreted as a learned behavior and not indicative of learned helplessness.

## Is immobility an adaptive behavior?

Reviews by West, as well as by Molendijk and de Kloet, have explained that immobility in the FST is likely a beneficial behavior for individual animals [4,6]. Swimming and climbing expend unnecessary energy, and animals who are quicker to realize this have a greater chance for survival in extended submerged situations. In experiments described by Nishimura *et al.*, rats were forced to swim until they sank—as long as two hours. Experimenters found that the amount of time spent immobile within the first 15 minutes of the test predicted sinking—the rats who struggled longer were quicker to sink, while the rats who conserved their energy floated longer before sinking [7]. The experimenters noticed that rats who struggled and swam longer also defecated more, potentially signifying increased fear in the "less adaptive" group.

Molendijk and de Kloet argue that the FST lacks essential forms of validity used to assess animal models of human diseases or conditions: construct and face validity [6]. Because the development of depression is a slow process, a test lasting 15 minutes or even tests conducted over 24 hours cannot be used to determine depression [8]; therefore, the FST lacks construct validity. The FST lacks face validity because "there is no single sign or symptom of depression modeled apart from the anthropomorphic interpretation of floating behavior in terms of despair" [6] and because there is "little similarity between the clinical symptoms of depression in humans and the behaviors measured in the test" [9].

Another way to interpret the potentially adaptive behavior of immobility during the FST is to consider that an animal's actions may represent their individual response to the stressor of being immersed in water, not knowing when or if escape will be possible. Some animals react to this situation actively by struggling, and some react passively by floating. Commons and colleagues write:

> ***While it could be argued that passive coping strategies to stress are characteristic of depression, the connection between swimming and the human condition begs an abstraction at best. Behavior in the FST is a reaction to the acute stressful stimulus of being placed in a container without an escape route, and human depression reflects a chronic subjective emotional state rather than a reaction to an individual stimulus. [9]***

## Interpretations of the FST are at odds with biochemical reality

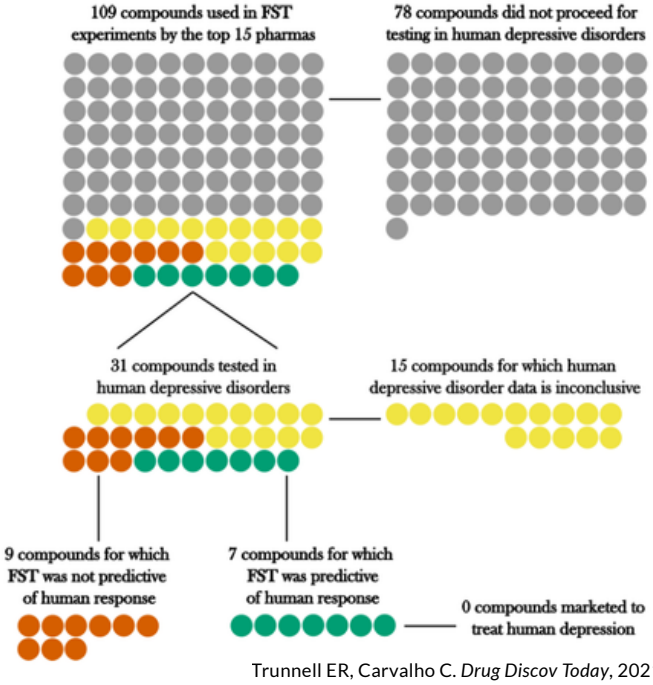
The methodology by which the FST was discovered casts doubt on the notion that immobility can be equated with "despair." Experimenters saw that acute administration of antidepressants decreased immobility; however, most antidepressants do not work in humans to relieve depression when administered acutely. As noted by University of Cork neuroscientists:

> ***The FST and TST have been criticised because they are sensitive to acute treatment with an antidepressant drug, whereas several weeks or months of antidepressant treatment is required before a clinical response is reported. Because the inducing factor (acute stress of swimming or suspension) is intrinsically coupled with the readout (time spent immobile), these tests also muddy the water between definitions of test versus model. [10]***

The acute immobility response of mice and rats to antidepressant treatment, compared with repeated exposure required for humans to note antidepressant effects, indicates that these drugs act on—and these observed behaviors reflect—different mechanisms between species.

Some experimenters have shown that chronic treatment with the antidepressant fluoxetine also reduces immobility in mice [11]. However, the expected immobility response also occurs after treatment with drugs that are not used as antidepressants, such as antihistamines and other unrelated compounds [12], putting the entire premise on unstable ground. Newer, fast-acting antidepressants show varied and unreliable results in the FST, and, importantly, data supporting their use has come primarily from human studies and exposures [13–17].

In an analysis published in 2021, PETA neuroscientist Emily R. Trunnell, Ph.D., and psychologist Constança Carvalho, Ph.D., showed that the use of the FST by major pharmaceutical companies did not reliably predict whether experimental compounds would be effective in treating human depression or ultimately be marketed successfully as antidepressants. Of the 109 compounds identified as having been used in FST experiments by the top 15 most profitable pharmaceutical companies, less than a third were also explored in humans with depression, and, of these, there were only three compounds for which the FST appeared to positively predict antidepressant efficacy [18]. However, not one of the 109 compounds is currently approved to treat any form of depression (see right).




Trunnell ER, Carvalho C. *Drug Discov Today*, 2021

## Experimental and strain confounds

Experimental details such as water temperature and depth can alter an animal's behavior during the FST and potentially confound results. Jefferys and Funder conducted an experiment to test whether water temperature influenced rats' mobility. They found that when the water was 20°C, rats spent less time immobile and were slower to learn immobility behavior over the course of the experiment (which

included four exposures to the water tank) compared to when the water was 25 or 30°C [19]. A different outcome has been observed for mice, with immobility decreasing in warmer water [12,20]. The depth of water used by experimenters also influences FST results. In one study, placing rats in water with a depth of 35 cm increased swimming and decreased immobility compared to situations in which rats were placed in water with a depth of 15 cm [3]. Presumably, the rats could detect the bottom of the container with their tails at 15 cm.

Importantly, mice show different types of behavior in the FST depending on their strain. When comparing 11 commonly used strains of mice, Lucki and colleagues found that time spent immobile differed more than tenfold between the strain that swam the most and the one that swam the least [21]. Strains also differ in sensitivity to antidepressant drugs administered before the FST. Dulawa *et al*. noted strain differences in response to chronic fluoxetine treatment, where the drug regimen affected swimming and immobility times in BALB/c mice but not in three other strains, including the ubiquitous C57BL/6 mouse [11].

Other factors that may confound FST results include water cylinder diameter, the age and sex of the animals, the time of day at which the study was conducted, the availability of food, the animals' housing conditions, the laboratory environment, the visibility of other tested animals, and more [22,23]. The reality that these variables can alter FST results so dramatically and have the potential to confound interpretation further invalidates it as a reliable measure of despair or behavior in general.

## Publication bias and incomplete reporting inflate FST results

In addition to these confounds, a systematic review and meta-analysis of studies using the FST for antidepressant screening identified a "remarkable" level of publication bias [24]—meaning that studies reporting positive results are disproportionately represented, while many negative or neutral findings likely remain unpublished. This imbalance skews the evidence base, making the overall effectiveness of antidepressants in the FST appear stronger and more consistent than it actually is.

Reporting of key experimental details was also lacking. Only 1% of studies reported sample size calculation, randomization, or blinding, and effect sizes (how strongly antidepressants "worked" in the FST) were inflated. This exaggeration of effect size means that studies are consistently suggesting that antidepressants are quite effective based on their FST data, but reality is likely less impressive. The authors concluded that, together, these findings raise "concerns about the validity of the FST literature" [24].

## The FST is used to draw false conclusions

A major problem with misinterpretation of the FST is that it has led to a false assumption that it can be used to measure depression in animals. Absurdly, it has sometimes led to the assumption that the FST can serve as the sole measure used in a study to describe an animal's mood and, in turn, **to** make inferences about human mood.

In a commentary in *Psychoneuroendocrinology*, Molendijk and de Kloet estimate that in the 4,300 papers reporting use of the FST at the time of publication, "[n]o less than [2,020] papers label the phenotype of the floating rodent as depression-like behavior—sometimes with a remark that the validity of the test is debated but often without discussion" [6]. Additionally, 7.5% of these (320 papers) had "used the FST to monitor the outcome of genetic manipulations of signaling pathways suspected to be involved in the precipitation of depression-like symptoms. Most of these studies (we estimate 70%) indeed infer a depression phenotype from the immobility response displayed by the rodent" [6]. In a 2019 follow-up analysis, Molendijk and de Kloet found that "the popularity of the FST [was] still increasing" in the three years prior [25]. Of the papers they analyzed, 72% qualified the behavior of a floating mouse or rat as "depressive-like, but without evidence for face, predictive, or construct validity" [25].

## The FST in stress research

The use of the FST in stress research is on the rise [26]. It's clear that the FST is stressful, as demonstrated in the compilation video of the test here. When an experimenter places an animal into the water, the animal's stress is clearly visible, and they sometimes defecate in the water. However, the FST should not be used to make inferences about stress in humans.

Humans typically experience stress due to their jobs or careers, comparing themselves to others, health problems and access to care, national and world events, financial pressure, discrimination, and relationship issues [27]. These types of stressors, which are typically chronic, stand in stark contrast with the acute stress of potential drowning—something that, thankfully, few humans are forced to cope with in their lifetime. When acute, life-altering stressors do occur, they can result in post-traumatic stress disorder (PTSD), which is difficult to assess in animals since many of the psychological symptoms, such as flashbacks, emotional numbness, and detachment, are not measurable. Many of the symptoms that experimenters can observe in animals and attempt to pin on depression or PTSD could be attributed to other types of mood disturbances [28] or species-specific factors entirely unrelated to stress or emotion.

The increased baseline stress levels experienced by animals held and used in laboratories further undermine the relevance of the FST for human stress research. Unnatural laboratory settings inherently do not meet the ethological needs of any animal and introduce confounding variables stemming from confinement-induced stress, undermining the value of the data collected from these animals.

Several specific factors contribute to baseline stress in the experimental setting:

- Experimenters keep mice and rats in unnaturally cold temperatures for the duration of their lives [29].
- Experimenters often force animals to live in solitary confinement [30], inside small cages devoid of any meaningful enrichment [31], which, along with feeding them an unnatural and unvaried diet, impacts their metabolic health [32].
- Experimenters make animals perform complicated and distressing behavioral tasks at times that are biologically irrelevant to their normal activity cycles [33,34].
- Abnormal behavior is common in animals in laboratories and is considered a direct result of living in that environment. Abnormal behavioral patterns have even been linked to long-term effects in abnormal physiological development and brain functioning, with some of these patterns thought to reflect permanent brain dysfunction [35].

These factors increase stress-related morbidity and mortality [36] and result in experiments being conducted on animals who are fundamentally different from their wild counterparts, and even further removed from humans. Philosopher and bioethicist Monika Piotrowska put it this way:

> ***When rodents are stressed in the lab, all of them—as a genetically homogenous group—swim less and float more in the FST than rodents in the control group that have not been stressed. Hence, there is a significant disanalogy between the model rodent population and the target human population. If the rodent population were representative of the human population, only a small fraction of the stressed rodents would swim less and float more. [37]***

## Industry, academia, and funders abandon the FST

Following discussions with PETA scientists beginning in December 2018, 19 companies have committed not to conduct, commission, or fund the FST [38]. These are:

- **Abbvie**
- **Amgen**
- **Astraea Therapeutics**
- **AstraZeneca**
- **Bayer**
- **Boehringer Ingelheim**
- **Bristol Myers Squibb**
- **Creative Biolabs**
- **DSM Nutritional Products**
- **German Mouse Clinic**
- **GSK**
- **Johnson & Johnson**
- **Melior Discovery**
- **Novo Nordisk A/S**
- **NutriFusion LLC**
- **Pfizer**
- **Roche**
- **Sage Therapeutics**
- **Sanofi**

Since January 2020, more than 40 research universities and institutes have confirmed to PETA entities or collaborators that they either stopped using the test or would not permit it. These include:

| Australia and New Zealand |
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| La Trobe University |
| Macquarie University |
| University of Adelaide |
| University of Melbourne |
| University of South Australia |
| University of Waikato |
| University of Western Australia |
| Victoria University of Wellington |
| **India** |
| Al Azhar College of Pharmacy |
| Chitkara University |
| CT University |
| Himachal Institute of Pharmacy |
| Guru Angad Dev Veterinary and Animal Sciences University |
| **Latin America** |
| Pontificia Universidad Católica de Chile, Chile |
| Universidad Austral de Chile, Chile |
| Universidad César Vallejo, Peru |
| Universidad del Valle, Colombia |
| Universidad Nacional de Mar del Plata, Argentina |
| Universidad Nacional de Trujillo, Peru |
| Universidade Federal de Uberlândia, Brazil |

| Switzerland |
|---|
| University of Bern |
| **United States and Puerto Rico** |
| Berea College |
| Butler University |
| Hamilton College |
| Marian University |
| Ponce Health Sciences University |
| University of Indianapolis |
| **United Kingdom** |
| Kings College London |
| Newcastle University |
| The University of Manchester |
| University of Bath |
| University of Brighton |
| University of Bristol |
| University of Exeter |
| University of Glasgow |
| University of Leeds |
| University of Liverpool |
| University of Nottingham |
| University of St. Andrews |
| University of Southampton |
| University of Warwick |
| University of York |

The following funding bodies and charities have also stated that they will not fund projects that include the FST or will place restrictions on its use:

| Australia | United Kindom |
|---|---|
| Australian Research Council<br>National Health and Medical Research Council | Brian M. Anselmo Foundation<br>Medical Research Scotland<br>The Dunhill Medical Trust |

## Regulatory opinions on the FST

No national or international bodies require the FST. The test has been discouraged by scientists with the U.K. Medicines and Healthcare products Regulatory Agency, who published a paper discussing its irrelevance to drug efficacy and the danger that its use could erroneously filter out potentially effective antidepressants [17]. The U.S. Food & Drug Administration has also confirmed that it does not require data from the FST for regulatory submissions [39].

In 2019, the European Medicines Agency's Committee for Medicinal Products for Human Use issued its public assessment report on Spravato (esketamine), a recently approved antidepressant. The assessment revealed that no "animal models of depression" (a category including the FST) were performed by the applicant Janssen and that the agency agreed that "animal models of depression or antidepressant-sensitive behavioural tests are poorly predictive for the human situation" and "would not add further value to the overall assessment"[40].

In 2024, PETA scientists and collaborators published a paper in *Regulatory Toxicology and Pharmacology* recommending that the International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH) issue guidance against the use of the forced swim test for regulatory purposes, listing specific actions that ICH could take to address the continued use of this test by some pharmaceutical companies [41].

In 2025, the Pharmacy Council of India directed all agencies under its purview to review and take necessary action on the continued use of the forced swim test [42], a request that it reissued in January 2026.

## Regional and national policy changes

### Australia and New Zealand

Thanks to legislation introduced by the Animal Justice Party and advanced by Animal-Free Science Advocacy, the FST has been made illegal in New South Wales as of 2024 [43]. The Australian Veterinary Association has also issued a statement that the organization "does not support the use of forced swim tests on animals in medical research" [44].

In 2023, the New Zealand (Aotearoa) government research institute AgResearch, which oversees the use of animals in experimentation **across** more than 40 other institutions in the country, revised its code of conduct—a legally binding document—to state that its ethics committees "will not consider an application" [45] that includes the forced swim test. This development results from a campaign by the New Zealand Anti-Vivisection Society.

Elected officials in New Zealand have a low opinion of the FST and support a transition away from its use. In a report from a meeting in which the FST was reviewed, the government's Economic Development, Science and Innovation Committee discussed the disadvantages of the test and called an

expert witness who commented on the FST's "ethical cost" and "lack of utility" [46]. The FST is now considered obsolete in New Zealand.

### Germany

Competent authorities and federal animal welfare officers have confirmed that the FST is currently not being carried out in three German states: Brandenburg, Bremen, and Hesse [47].

### Ireland

In February 2026, Ireland's National Committee for the Protection of Animals Used for Scientific Purposes (NCPA) issued a report on the FST that had been commissioned by the country's Health Products Regulatory Authority in July 2024. NCPA found evidence to severely restrict the FST in Ireland, prohibiting its use as a model of depression or to study "depression-like" behaviors or anxiety disorders. NCPA noted the "questions over its validity for these purposes" [48]. Additionally, experimenters will no longer be permitted to force animals to swim to exhaustion in Ireland.

### United Kingdom

In 2024, the Home Office stated its intention to eradicate the FST from the U.K. [49]. Lord Sharpe of Epsom, the Parliamentary Under Secretary of State for the Home Office at the time, accepted the recommendations set forth by the Animals in Science Committee in 2023 [50], which means that the FST can no longer be used as a model of human depression or for studies of anxiety and its treatment in the country. In October 2025, the Home Office published additional statistics on the use of the test in the U.K. in 2024, its first time designating the FST as a "technique of special interest" [51]. Notably, the U.K. defines the FST as "any procedure in which an animal is placed into a container of water, out of its depth, with no means of escape" [50,51].

In November 2025, the Department for Science, Innovation & Technology (DSIT) explicitly prioritized the development, validation, and uptake of non-animal approaches to replace the FST in its 2025 UK Replacing Animals in Science Strategy. DSIT noted the following:

> ***The test has limited scientific validity, particularly its translational relevance to human mental health disorders. Animal behaviour in the FST also lacks information on treatment latency and varies across strains and protocols. Therefore, we would expect the Home Office Regulator's default position to be that the FST does not pass the harm-benefit test required under ASPA [Animals (Scientific Procedures) Act] … The current 3 active licences which authorise the use of the FST will conclude by 2028. [52]***

## What can be used instead of the FST?

The evidence reviewed in this report leaves no scientific or ethical justification for continued use of the FST. When a test produces unreliable and misleading data, is cruel to animals, and there are no requirements to conduct it, ending use of the test is the obvious choice. There is nothing to be lost by ceasing all use of the FST today, and nothing to be gained from waiting for a one-to-one alternative to the FST to be validated. It's simply unnecessary.

However, there is a significant need for better methods to predict antidepressant efficacy in humans. Eliminating the FST, TST, and similar animal behavioral tests could be the push the industry needs to shift toward human-based research and drug discovery for understanding and treating depressive disorders. A look at the cosmetics sector shows that bans can accelerate scientific transition, as regulatory bans and deadlines for ending animal testing for cosmetics helped accelerate investment in

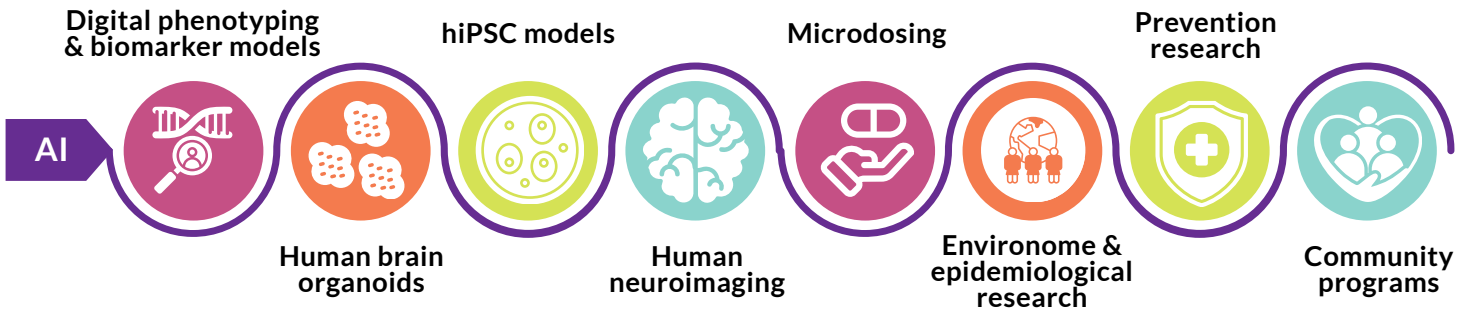
non-animal methods, including *in vitro*, *in silico*, and other non-animal approaches that are now central to modern cosmetic safety evaluation [53,54].

Human-based depression research and drug development are already underway. Scientists are studying biomarker-based human models, including assessing changes in BDNF and other neurotransmitters or markers across patient populations [17]. Others are using human brain organoids [55–58], and human induced pluripotent stem cells (hiPSCs) to test the functional effects of drugs on neurons derived from individuals with depressive disorders [59,60]. Human neuroimaging and companion tools have also advanced substantially and are now producing detailed brain data that can be used to define subtypes of depression based on brain function and treatment response, alongside platforms that support reproducible and portable image analysis [61,62]. In addition, advances in artificial intelligence (AI) are enabling the integration and analysis of vast datasets to identify patterns and to develop and use computational psychiatric approaches to model depressive disorders and expedite drug screening [63–68].

Microdosing, sometimes called a phase 0 trial, involves administering sub-pharmacological doses of a drug candidate to a small number of participants to obtain early information on its pharmacokinetics, bioavailability, and distribution in the body [69]. Microdosing is particularly valuable in neuropsychiatric drug development because it enables early evaluation of the compound's ability to cross the blood–brain barrier, its distribution in the brain, and—when combined with molecular imaging techniques such as positron emission tomography (PET)—its interaction with or occupancy of specific molecular targets in the human brain [70]. These factors can be decisive for the success or failure of an antidepressant candidate and cannot always be detected through other preclinical approaches [71,72]. Human microdosing studies can be strategically integrated with *in silico* methods, human cell *in vitro* assays, and neuroimaging studies to support decision-making and reduce uncertainty in the initial stages of development [69].

Data generated through the everyday use of personal devices, such as smartphones and wearable sensors, can be systematically collected for digital phenotyping. This approach allows researchers and providers to continuously observe behavioral and physiological variables associated with depression—such as sleep patterns, physical activity, circadian rhythm, mobility, phone use, and social interaction—without invasive experimental intervention and before they're fully evident in clinical assessments. Unlike point-in-time clinical assessments or retrospective self-reports, digital phenotyping provides longitudinal measurements that reflect how individuals function in their daily environments [72–74]. In antidepressant clinical trials, digital phenotyping data are being used to monitor treatment response, detect early changes associated with improvement or relapse, and complement traditional endpoints [73]. When combined with computational analyses and AI, digital phenotyping generates continuous behavioral measures and can link clinical changes with genetic traits, offering a quantitative framework for evaluating the course of antidepressant treatment over time [74].

**A Human-Centered Ecosystem for Understanding & Treating Depression**



With fewer resources being allocated to animal-based paradigms like the FST, a renewed focus can be placed on prevention research and community-based research and programs. For example, the European Commission's Decoding Depression project draws on transdisciplinary scientific and lived-experience data to examine how biological, social, and environmental factors interact across the life course, emphasizing the role of the broader "environome" and supporting this work through an interactive platform that integrates and navigates the evolving scientific evidence on depression to guide policy interventions [75].

These human-centered approaches are not one-to-one replacements for the comparatively simple FST, and they are not meant to be. Depression is a complex, heterogeneous condition that requires integrated, transdisciplinary methods capable of capturing its biological, psychological, and environmental dimensions. Efforts to reduce this complexity to simplified, black-box assays have constrained progress, reflected in decades of limited therapeutic innovation and translational success. Advancing the field will depend on embracing this complexity, rather than attempting to strip it away.

## Conclusions and recommendations

Animal experimentation has been cited as the primary source for attrition, or drug failure, in human neurobehavioral clinical trials [76], signaling that there is something fundamentally wrong in this field. For decades, experimenters have subjected mice, rats, and other small animals to stressful procedures in which they are forced to swim in water or hang by their tails with no way to escape. The FST and TST have been used to make uninformed determinations about an animal's mood and potentially false inferences about biological processes related to human health.

The use of the FST and TST has wasted public funds, animal lives, and research hours that could have instead been spent on human-relevant research and programs. This pattern is preventable, and the responsibility for ending this flawed practice is widely shared.

### Key stakeholders should take the following concrete steps immediately:

- Institutional, regional, and national legislative and ethical bodies can prohibit specific animal tests like the FST and TST.
- Regulators can issue guidance discouraging applicants from conducting the FST or TST for the purpose of obtaining data for regulatory submissions.
- Funders can reject proposals that include the FST or TST.
- Journals can prevent spurious conclusions based on the FST or TST from being reported and circulated in the literature by rejecting or rigorously scrutinizing manuscripts including animal behavioral protocols.
- Researchers can develop skills and expertise in non-animal methods and build collaborations with experts doing non-animal neuroscience research. Faculty administrators can encourage this training and teamwork.

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