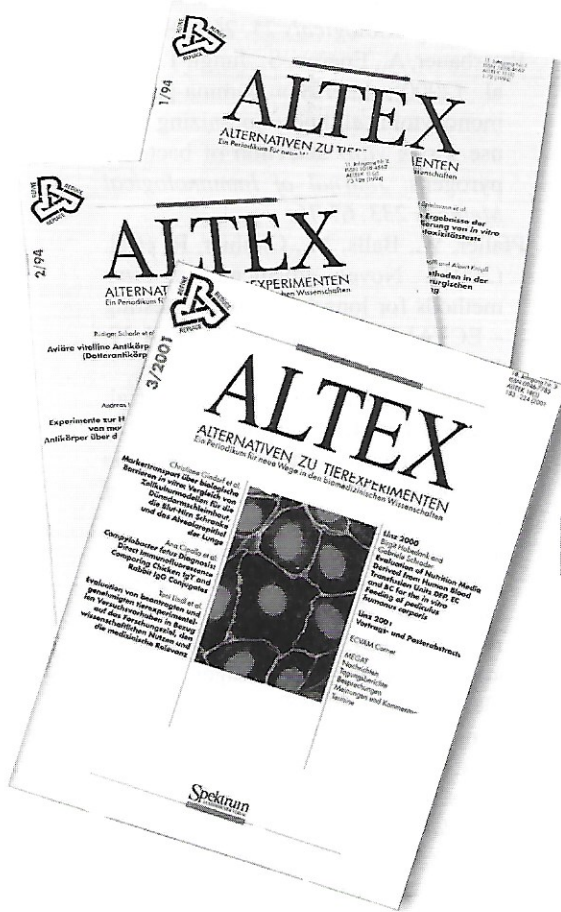


# Empfehlen Sie ALTEX weiter!



- Weil Sie wissen, wie wichtig es ist, regelmäßig über die neuesten Entwicklungen und Forschungsansätze im biomedizinischen Bereich informiert zu werden.
- Weil Sie wissen, daß „3R-orientierte“ Forschung ein Forum braucht, damit sie wahrgenommen und gehört wird.
- Und weil Sie wissen, daß nur ein solider Abonnentenstamm langfristig den Bestand von ALTEX sichern kann.

Empfehlen Sie deshalb jeder Person in Ihrem Umkreis, die sich für „3R-orientierte“ Forschung interessiert, ALTEX zu abonnieren.

## Oder empfehlen Sie sich mit einem Geschenkabo!

Als Dank für Ihre Empfehlung erhalten Sie wahlweise eins der beiden abgebildeten Bücher. Nur Faxcoupon ausfüllen, kopieren und faxen!

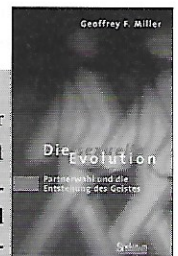
## Wählen Sie Ihre Prämie!

### Geoffrey F. Miller Die sexuelle Evolution

In diesem brillanten und provozierenden Buch erkundet der Evolutionspsychologe Geoffrey Miller die evolutionäre Macht der sexuellen Auswahl und zeigt dabei, wie viele Aspekte des menschlichen Geistes das Produkt der sexuellen Selektion sind.

### Lexikon der Naturwissenschaftler

In einzigartiger Informationsdichte und Bandbreite präsentiert das einbändige *Lexikon der Naturwissenschaftler* ca. 3.000 Naturwissenschaftler und Erfinder von der Antike bis zur Gegenwart mit ihren biographischen Daten, ihren wissenschaftlichen Leistungen und wichtigsten Werken.



**kopieren und faxen – Bitte zurück an Fax: 06221 - 91 26 338**

### Ja, ich möchte ALTEX verschenken!

- ☐ Bitte schicken Sie die nächsten 4 Ausgaben von ALTEX an nachfolgende Adresse. Die Rechnung schicken Sie bitte mir. Sobald ich diese beglichen habe, schicken Sie mir mein Prämiengeschenk.

Datum / Unterschrift \_\_\_\_\_

### Ja, ich empfehle ALTEX weiter!

- ☐ Bitte schicken Sie ALTEX ab der nächsten Ausgabe an die nachfolgende Adresse. Ich garantiere die Abnahme für mind. 1 Jahr (danach bis auf Widerruf). Das Prämiengeschenk bekomme ich, sobald der von mir geworbene Abonnent seine erste Abo-Rechnung beglichen hat.

Datum / Unterschrift \_\_\_\_\_

### Bitte hier die Adresse des Neuabonnenten eintragen:

Name / Vorname \_\_\_\_\_

Straße \_\_\_\_\_

PLZ / Ort \_\_\_\_\_

### Neu-Abo ist

- ☐ Normal-Abo für Privatbezieher für € 59,- / CHF 98,-  
☐ Studenten-Abo für € 19,- / CHF 30,- – Nachweis erforderlich  
☐ Abo für Institute, Firmen, Bibliotheken u. ä. für € 129,- / CHF 195,-  
 zzgl. Versandkosten

### oder schicken an:

Spektrum Akademischer Verlag  
 Slevogtstr. 3-5  
 D-69126 Heidelberg

### Absender:

Name / Vorname \_\_\_\_\_

Straße \_\_\_\_\_

PLZ / Ort \_\_\_\_\_

### Als Prämiengeschenk wähle ich:

- ☐ das Buch „Die sexuelle Evolution“  
☐ das Buch „Lexikon der Naturwissenschaftler“

**Widerrufsrecht:** Diese Bestellung kann innerhalb von 10 Tagen schriftlich bei Spektrum Akademischer Verlag, Slevogtstr. 3-5, D-69126 Heidelberg, widerrufen werden. Zur Fristwahrung genügt die rechtzeitige Absendung.

Datum / 2. Unterschrift \_\_\_\_\_

Jane Huggins

## Alternatives to Animal Testing: Research, Trends, Validation, Regulatory Acceptance

Experiments designed to evaluate how closely results from an *in vitro* assay mirror those obtained from an *in vivo* assay have been performed practically since the beginning of the alternatives to animal testing movement (and much earlier if we look at early experiments performed "*in vitro*" in many disciplines). However, only recently has this type of exercise been subjected to attempts at formalization and standardization. These relatively recent efforts have been prompted by the need to evaluate objectively those *in vitro* assays that could be used to reduce, refine, or replace animals in medical experimentation in order to promote regulatory acceptance of them.

Validation of alternative methods has just emerged from a rather chaotic phase in which the principles behind appropriate conduct of a validation study were defined, mainly through trial and error. Much refinement has come out of this "exploratory" phase, including recognition that validation studies should be built upon a solid platform, consisting of components such as good reference standards, reliable protocol transfer between laboratories, and appropriate application of biostatistical techniques. Efforts are now underway to apply these lessons learned to future validation studies and to harmonize validation techniques among countries in order to maximize the possibility that the data generated can be used worldwide.

So, despite the fact that some *in vitro* assays may not have been validated in the past due to faults inherent in the validation study and not in the assay, future attempts to validate *in vitro* assays will benefit from a better understanding of the requirements of validation and standardization of the conduct of

validation studies. Furthermore, validation of endpoints that are not directly correlated with a defined mechanism of action is slowly becoming more acceptable. This is due, in part, to our increasing realization of the fact that our knowledge about mechanisms of action at any given time may be limited. It is hoped that this perspective will be taken into consideration by regulatory bodies charged with the task of evaluating and ultimately, accepting alternatives to animal testing as viable tests of toxicity. If so, Koëter's second reason for the lack of regulatory acceptance of alternatives mentioned above (i.e. "toxicologists/regulators appear reluctant actually to use the data provided for hazard and risk assessment procedures because of a lack of confidence with the (types of) endpoints of the new test") may be set aside as no longer viable.

Validation, while not an actual alternative to animal testing, certainly can be said to be the "gateway" through which each proposed alternative must pass in order to find acceptance as a viable test of toxicity. Therefore, the methods by which we conduct validation studies are as important, if not more so, than those by which we conduct an alternative assay. Our previous attempts at validation have been well meant, but expensive, and, in some cases, not so well planned or executed. We have, however, through reassessment, honed the technique and applied it successfully to produce validated alternatives to animal testing. All that truly remains to be done is to see that the technique is used consistently to evaluate alternative methods, thereby contributing to a much needed "atmosphere of trust" among scientists, the industrial sector, and regulators.

Franz P. Gruber

## Alternatives in Basic Research and Education

In contrast to animal testing required by law which is supposed to guarantee minimum safety standards in licensing drugs and chemicals there are no such regulations in basic research which require scientists to perform animal tests.

Certain questions are being posed and hypotheses are being examined which, in many cases, can only be answered by using animal tests. Just as easily, different questions could be asked or different hypotheses could be examined which would not call for animal tests.

The least one could do in basic research is to avoid tests leading to severe suffering of the animals, the way it is required in Switzerland by binding ethical principles and guidelines.

There are many examples of successful alternative methods in basic research. Only, the application of such methods is, in most cases, limited to the laboratory in which they were developed. Exceptions are those procedures which are customary worldwide, like the production of monoclonal antibodies in the ascites mouse, a procedure which can also be performed *in vitro* with some good will.

In numerous cases though, it is simply a lack of will to change procedures to methods without animal tests or to pose questions different in order to avoid the use of animals or to reduce their number or, at least, to reduce stress.

A change of this situation is possible only if those public funds are now increasingly channeled into basic research which previously were assigned predominantly to testing alternatives to the animal tests required by law.

There has got to be a financial incentive to change procedures in basic research to those free of animal testing. Through ethical considerations alone, there will be little movement or change. It is unacceptable that, while numbers of animal tests decrease in licensing of drugs and chemicals, they are increasing in basic research.

In education, it has to be the principal degree not to force anyone against his or her will to participate in animal tests or to do work with on dead animals, killed especially for such purpose. Demonstration of the absolute basics such as glucose-resorption by intestinal tissue using animal tests evidences only a lack of





sensitivity towards students who still maintain respect for life. In countries where animal testing in education is reduced to close to zero, no less qualified scientists are therefore being trained. There are sufficient methods to convey biomedical foundations without animal tests and without killing animals. This begins with computer-simulations and continues to didactically very compelling self-tests. The problem lies within the acceptance or the lack of acceptance of such methods by the

teacher or the faculty. There are even greater problems, on a world-wide scope, in countries where animal testing is still part of the high-school curriculum. It could be of interest to investigate if in such countries a specific propensity to violence in schools and in society proves to be higher than in those countries where young people learn the basic of biology by peaceful means and methods.

*Brigitte Rusche*

## The 3Rs and Animal Welfare – Conflict or the Way Forward?

The 3Rs concept is centered around animal experiments. In European legislation, animal tests are categorised according to their respective purposes. For example, in the German Animal Welfare Act, they are subdivided into procedures and treatments for experimental purposes, for the purpose of education and continuing education, and for the production, storage or multiplication of substances, products or organisms, and lastly for the fulfillment of legislative demands. In accordance to their purpose, different legislative rules with differing levels of stringency apply. In contrast, in Switzerland all animal experiments are covered by the same licensing procedure, irrespective of their purpose.

For animal welfarists, the term “animal experiment” covers all procedures and all treatments that inflict pain, fear and/or distress to the animals, provided that they are not performed with the direct aim of helping that specific animal. It is taken for granted that the individual animal suffers from the experiment regardless of its purpose in a manner that is at least similar to the way a human being would suffer under the same circumstances. When truly applying the ethical principle of animals being “co-creatures”, it is unacceptable if sensitive animals are forced to endure treatments, which humans themselves are not willing to endure. Animal welfarists stand up for preventing animals from having to endure such suffering. In consequence, this means that they demand the abolition of animal experiments – and this without delay.

Those people who consider animal experiments to be acceptable or who perform them themselves don't see the animal in first instance, but the goal envisaged by the performance of the experiment. Therefore one of the main questions that underlies all research in the 3Rs principle is the question of whether one can achieve one's goal with less distress for the animal, with less animals or even altogether without animals. This attitude is based upon the conviction that the ethical responsibility towards humans has a higher value than the responsibility towards animals. The main incentive is to prevent humans from having to suffer from damages through substances or products or from unwanted side effects through pharmaceuticals, to understand diseases and to strive for their cure or alleviation. Whenever a scientist finds a way to achieve these goals without animals, the

animal welfarist's request for the abolition of animal experiments is fulfilled.

Evidently, this explanation does not go far enough to describe the differences and the overlaps of the positions of animal welfarists and of those who accept animal experiments. It is not without reason that the discussion on animal experiments is so multi-faceted and is held with such high emotions. A typical pattern for this discussion would be that the one side presents arguments that show that animal tests lead to incorrect results, that they poorly represent the situation in humans and thus are not beneficial to humans. The latter point also being true, since investments are being made into the wrong methods, which prevents a new and better kind of research and application of test methods from becoming reality (or at least impedes it).

A typical argumentation from the other side is that the experimenter very well knows the limits of his test methods and knows how to cope with them. In further defense of animal experiments that are currently being performed or that are planned in the future, scientists tend to refer to patients that have received organ transplantations or that are receiving life-long medications without which they would be unable to lead an acceptable life. And lastly they recollect that patients suffering from Alzheimer's disease, from Parkinson's or from cancer are putting all their hopes into future medical discoveries and that these can only be achieved with animal tests.

On the other side, animal welfarists contend that the motivation to perform an animal experiment does not always lie in the ethically motivated desire to help humans, but also in the desire to achieve neutral knowledge gain, in the desire for financial profit and for obtaining a higher professional degree. They also claim to be motivated by wanting to help and protect humans, animals and the environment, and to prevent them from diseases. They emphasise that there is no reason to believe that they want to save animals at no matter which price – even at the cost of human life – which is often purported by the other side. But they are also not willing to accept that without further questioning or at the slightest hint of a dilemma the decision immediately is made to the animal's disadvantage. Both for ethical and for scientific reasons, it is no longer acceptable if the animal experiment remains to be the “standard procedure”.