

THINK ANIMAL RIGHTS ACTIVISTS ARE THE ONLY ONES WHO QUESTION ANIMAL EXPERIMENTATION?

Rothwell stated in the *Lancet* in 2006 (368 (9532):262-6):

Indeed, most major therapeutic developments over the past few decades have been due to simple clinical innovation coupled with advances in physics and engineering rather than to laboratory-based medical research. The clinical benefits of advances in surgery, for example, such as joint replacement, cataract removal, endoscopic treatment of gastrointestinal or urological disease, endovascular interventions (eg, coronary and peripheral angioplasty/stenting or coiling of cerebral aneurysms), minimally invasive surgery, and stereotactic neurosurgery, to name but a few, have been incalculable. Yet only a fraction of non-industry research funding has been targeted at such clinical innovation. How much more might otherwise have been achieved?

Höerig and Pullman 2004 (*J Transl Med* 2:44):

. . . animal models themselves have a poor record of predicting human disease outcome. . .

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Alan Oliff, former executive director for cancer research at Merck Research Laboratories in Pennsylvania stated in *Science* 1997 (278:1041-1042):

The fundamental problem in drug discovery for cancer is that the [animal] model systems are not predictive at all.

On January 12, 2006, then-U.S. Secretary of Health and Human Services Mike Leavitt stated:

Currently, nine out of ten experimental drugs fail in clinical studies because we cannot accurately predict how they will behave in people based on laboratory and animal studies.

In the April 1, 2010 issue of *The Scientist*:

Mouse models that use transplants of human cancer have not had a great track record of predicting human responses to treatment in the clinic. It's been estimated that cancer drugs that enter clinical testing have a 95 percent rate of failing to make it to market, in comparison to the 89 percent failure rate for all therapies . . . Indeed, "we had loads of models that were not predictive, that were [in fact] seriously misleading," says NCI's Marks, also head of the Mouse Models of Human Cancers Consortium . . .

Dr. Ralph Heywood, former director of Huntington Research Center (UK) stated in *Animal Toxicity Studies* in 1989: "... the best guess for the correlation of adverse reactions in man and animal toxicity data is somewhere between 5 and 25%."

The National Cancer Institute believes society may have lost cures for cancers because the drugs failed animal tests. (*Science* 1997, 278:1041-1042.)

From *The Scientist* (2002,16:22):

'There isn't a single genetically manipulated mouse that has been used yet to produce a drug that cures a disease,' says [Kathleen] Murray of Charles River Laboratories.

Crowley (*Am J Med* 2003, 114:503-505) commented on an article by Contopoulos-loannidis et al. (*Am J Med* 2003, 114:477-484):

The article by Contopoulos-loannidis et al. in this issue of the journal addresses a much-discussed but rarely quantified issue: the frequency with which basic research findings translate into clinical utility. The authors performed an algorithmic computer search of all articles published in six leading basic science journals (*Nature*, *Cell*, *Science*, the *Journal of Biological Chemistry*, the *Journal of Clinical Investigation*, the *Journal Experimental Medicine*) from 1979 to 1983. Of the 25,000 articles searched, about 500 (2%) contained some potential claim to future applicability in humans, about 100 (0.4%) resulted in a clinical trial, and, according to the authors, only 1 (0.004%) led to the development of a clinically useful class of drugs (angiotensin-converting enzyme inhibitors) in the 30 years following their publication of the basic science finding. They also found that the presence of industrial support increased the likelihood of translating a basic finding into a clinical trial by eightfold. Still, regardless of the study's limitations, and even if the authors were to underestimate the frequency of successful translation into clinical use by 10-fold, their findings strongly suggest that, as most observers suspected, the transfer rate of basic research into clinical use is very low.

Heidi Ledford in *Nature* 2008 (453 (7197):843-5):

In April this year, Nobel laureate Sydney Brenner brought the crowd to its feet at the American Association for Cancer Research meeting in San Diego, California. Brenner pioneered the use of the nematode *Caenorhabditis elegans* as a simple model for studying growth and development. But in his talk, he championed experiments on a more complicated creature: *Homo sapiens*. "We don't have to look for model organisms anymore because we are the model organism," he said.

Hampton, writing in *JAMA* in 2006 (296 (16):1951-2):

While investment in basic research in the United States doubled from 1993 to 2003, the number of therapeutics entering the clinic has actually declined. New compounds entering phase 1 trials today have about an 8% chance of reaching the market compared with about a 14% chance 15 years ago....

Carmichael and Begley wrote in *Newsweek* May 31, 2010

From 1998 to 2003, the budget of the NIH—which supports such research at universities and medical centers as well as within its own labs in Bethesda, Md.—doubled, to \$27 billion, and is now \$31 billion. There is very little downside, for a president or Congress, in appeasing patient-advocacy groups as well as voters by supporting biomedical research. But judging by the only criterion that matters to patients and taxpayers—not how many interesting discoveries about cells or genes or synapses have been made, but how many treatments for diseases the money has bought—the return on investment to the American taxpayer has been approximately as satisfying as the AIG bailout. "Basic research is healthy in America," says John Adler, a Stanford University professor who invented the CyberKnife, a robotic device that treats cancer with precise, high doses of radiation. "But patients aren't benefiting. Our understanding of diseases is greater than ever. But academics think, 'We had three papers in *Science* or *Nature*, so that must have been [NIH] money well spent.'?"

Dr. Richard Klausner, then-director of the National Cancer Institute as quoted in the *LA Times*, May 6, 1998:

The history of cancer research has been a history of curing cancer in the mouse . . . We have cured mice of cancer for decades—and it simply didn't work in humans.

AFMA realizes that the science is complex and that not everyone has the background to fully comprehend all the controversies in science. This brochure is not meant as an all-inclusive examination of the topic but rather as a limited introduction to the issue. For the more scientifically inclined, we recommend the book *Animal Models in Light of Evolution* by Shanks and Greek.