Advancing Research Together
The Role of Animal Research in the Era of COVID 19 – and More

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National Association for Biomedical Research
Animal research is

- Important
- Critical
- Necessary

Nearly every medical advancement over the last century is the byproduct of animal research.
Notable Medical Advances

- Tom Starzl, UPitt Transplantation Institute – multiple animal models
- DeBakey, Baylor cardiac & vascular research – calves and rodents; e.g., mouse echocardiology
- Blue Baby Syndrome – dogs at Hopkins
- Polio Vaccine developed with monkeys
- Columbia University – humanized congenic pigs for organ transplants
- Merck, GSK, Pfizer, J&J – NHPs for vaccines and antivirals including Chimpanzees for Hepatitis A, B & C, Varicella, MMR childhood vaccine ... and for antivirals like Crixivan and remdesivir
- Humanized Mice – the newest weapon in oncology research
- Elon Musk’s start-up Neuralink – pigs, Brain-Machine Interface, Deep Brain Stimulation (NHPs)
Nobel Prize Winners

• Nobel-winning animal research happens practically every year since 1901

• Of the 222 award recipients in the Physiology or Medicine category, 186 used animal models in their research

• This year’s winners Harvey J. Alter, Michael Houghton and Charles M. Rice won the Nobel Prize for their work with chimpanzees. Their groundbreaking research led to the discovery of the hepatitis C virus
Animal research is behind the top 25 drugs prescribed in the U.S. and nearly every prescription medication available today!

The FDA requires animal testing to ensure the safety of many drugs and devices

Animal models are necessary for understanding the safety, efficacy and proper dosages of new medicines and treatments

<table>
<thead>
<tr>
<th>RANK</th>
<th>DRUG</th>
<th>DRUG USAGE</th>
<th>ANIMAL MODELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lisinopril</td>
<td>high blood pressure, heart failure</td>
<td>dogs, guinea pigs, hamsters, mice, rats, monkeys, rabbits</td>
</tr>
<tr>
<td>2</td>
<td>Atorvastatin</td>
<td>high cholesterol and triglyceride levels</td>
<td>dogs, guinea pigs, hamsters, mice, rats, monkeys, pigs, rabbits, zebras, fish, cats</td>
</tr>
<tr>
<td>3</td>
<td>Levothyroxine</td>
<td>underactive thyroid gland (hypothyroidism)</td>
<td>cats, dogs, guinea pigs, mice, rats, monkeys, pigs, rabbits, horses</td>
</tr>
<tr>
<td>4</td>
<td>Metformin</td>
<td>high blood sugar, anti-diabetic medication</td>
<td>cats, dogs, mice, rats, monkeys, pigs, rabbits, frogs</td>
</tr>
<tr>
<td>5</td>
<td>Amlodipine</td>
<td>high blood pressure, chest pain</td>
<td>cats, dogs, hamsters, guinea pigs, mice, rats, monkeys, cheetas, monkeys, rabbits, frogs</td>
</tr>
<tr>
<td>6</td>
<td>Metoprolol</td>
<td>high blood pressure, chest pain, heart failure</td>
<td>cats, dogs, guinea pigs, mice, rats, monkeys, pigs, rabbits, zebras</td>
</tr>
<tr>
<td>7</td>
<td>Omeprazole</td>
<td>heartburn, a damaged esophagus, stomach ulcers, gastroesophageal reflux disease (GERD)</td>
<td>cats, dogs, hamsters, guinea pigs, mice, rats, monkeys, pigs, rabbits, zebras</td>
</tr>
<tr>
<td>8</td>
<td>Simvastatin</td>
<td>high cholesterol and triglyceride levels</td>
<td>dogs, hamsters, guinea pigs, mice, rats, monkeys, pigs, rabbits, zebras</td>
</tr>
<tr>
<td>9</td>
<td>Losartan</td>
<td>high blood pressure</td>
<td>mice, rats, monkeys, rabbits, sheep</td>
</tr>
<tr>
<td>10</td>
<td>Albuterol</td>
<td>wheezing, shortness of breath, asthma, chronic obstructive pulmonary disease</td>
<td>cats, dogs, hamsters, guinea pigs, mice, rats, monkeys, pigs, rabbits, zebras</td>
</tr>
<tr>
<td>11</td>
<td>Gabapentin</td>
<td>prevent and control seizures, relieve nerve pain</td>
<td>dogs, hamsters, mice, rats, monkeys, rabbits</td>
</tr>
<tr>
<td>12</td>
<td>Hydrochlorothiazide</td>
<td>high blood pressure, fluid retention</td>
<td>dogs, guinea pigs, mice, rats, monkeys, rabbits</td>
</tr>
<tr>
<td>13</td>
<td>Acetaminophen, Hydrocodone, Lortab</td>
<td>pain</td>
<td>cats, dogs, hamsters, mice, rats, monkeys, pigs, rabbits, zebras</td>
</tr>
<tr>
<td>14</td>
<td>Sertraline</td>
<td>depression, panic attacks, obsessive compulsive disorder, post-traumatic stress disorder, social anxiety disorder, severe form of premenstrual syndrome</td>
<td>dogs, mice, rats, monkeys, rabbits</td>
</tr>
<tr>
<td>15</td>
<td>Fluticasone</td>
<td>pain, itching, swelling, inflammation</td>
<td>guinea pigs, mice, rats, monkeys, rabbits</td>
</tr>
<tr>
<td>16</td>
<td>Montelukast</td>
<td>allergies, asthma</td>
<td>mice, rats, guinea pigs, rabbits, sheep</td>
</tr>
<tr>
<td>17</td>
<td>Furosemide</td>
<td>“water pill,” fluid retention from heart failure, liver disease and kidney disease, high blood pressure</td>
<td>cats, dogs, hamsters, guinea pigs, mice, rats, monkeys, pigs, rabbits, zebras</td>
</tr>
<tr>
<td>18</td>
<td>Amoxicillin</td>
<td>infections, stomach ulcers</td>
<td>cats, dogs, guinea pigs, mice, rats, monkeys, pigs, rabbits, zebras</td>
</tr>
<tr>
<td>19</td>
<td>Ranitidine</td>
<td>gastroesophageal reflux disease (GERD), duodenal ulcer</td>
<td>dogs, hamsters, mice, rats, monkeys, rabbits</td>
</tr>
<tr>
<td>20</td>
<td>Escitalopram</td>
<td>depression, anxiety</td>
<td>dogs, hamsters, mice, rats, monkeys, rabbits</td>
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</tbody>
</table>
Animals & COVID-19

- African green monkeys, anteaters, bats, camels, cats, chickens, cows, dogs, ferrets, flies, guinea pigs, hamsters, horseshoe crabs, llamas, macaque monkeys, mice, mink, pangolins, pigs, rats, snakes and treeshrews are helping researchers understand and defeat COVID-19.

- The USDA’s National Veterinary Services Laboratories confirmed cases of SARS-CoV-2 in mink, cats, dogs, lions, tigers and now a snow leopard.

- An FDA expert panel recommended the FDA approve Pfizer and BioNTech’s COVID-19 vaccine for emergency use. The mRNA vaccine had promising results in preclinical studies with mice and nonhuman primates and is 95% effective in human clinical trials.

- NIH and Moderna’s COVID-19 mRNA vaccine is also being considered for FDA EUA.
FBR COVID-19 Website Resources

- http://www.fbresearch.org/covid19
- Over 12,000 page views so far
- Updated daily with the latest articles

FBR's COVID-19 Resources

We're committed to improving health through education

List of Resources
- Coronavirus.gov
- CDC's COVID-19 What's New
- White House COVID-19 Task Force Briefings
- COVID-19 cases in the U.S.
- FDA's Remdesivir Control page
- American Anthropological Association's webpage of COVID-19 resources
- SADE Publishing's COVID-19 webpage
- ResearchAmerica's coronavirus resources
- American Society for Microbiology's novel coronavirus (COVID-19) resources
- Edit's global overview of how

Nearly every medicine, medical device, surgical procedure and therapy we have today has depended on animal testing and research. Animal research is one of the first steps in medical discovery.

Animal Research on the Front Lines

NOVEMBER

BREAKING NEWS: Nov. 9: "Great day for science": Pfizer shares early Covid vaccine analysis, FBR Blog

Nov. 9: "Pfizer, Texas Biomed see promising results in prototype vaccine," KSAT

Nov. 8: 'Researchers compare rhesus and cynomolgus macaques for SARS-CoV-2 vaccine trials,' News Medical

Nov. 8: 'Covid infections in animals prompt scientific concern,' The New York Times

Nov. 6: 'SARS-CoV-2 mink variant spreads to humans, raises concern about future vaccine efficacy,' BioWorld

*There are strains in which you vaccinate someone, they get infected with what you are trying to protect them with, and you actually enhance the infection. You can get a
COVID-19 and Animal Research Polls

FBR commissioned polls, which Echelon Insights conducted between March 20-24, between April 18-21, and again between Oct. 16-22, 2020.

• The polls were part of Echelon Insights’ monthly Verified Voter Omnibus tracking surveys

• Sample size of ~1,000 national registered voters

• Support for the humane use of animals in biomedical research went up after providing background based on Dr. Fauci’s remarks on animal research and COVID-19 (“There are diseases in which you vaccinate someone, they get infected with what you are trying to protect them with, and you actually enhance the infection. You can get a good feel for that in animal models,” Dr. Fauci said during a White House briefing on March 26.)

• It appears public figures have an important role in shaping the public’s perceptions on animal research
## COVID-19 and Animal Research Polls – March/April/October Comparison

<table>
<thead>
<tr>
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<th>March</th>
<th>April</th>
<th>October</th>
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<tbody>
<tr>
<td><strong>Q1</strong></td>
<td>Personally concerned</td>
<td>Extremely/ very = 51% Not very/ not at all = 15%</td>
<td>Extremely/ very = 59% Not very/ not at all = 13%</td>
</tr>
<tr>
<td><strong>Q2</strong></td>
<td>Support or oppose animal research</td>
<td>Strongly/ somewhat support = 50% Strongly/ somewhat oppose = 34%</td>
<td>Strongly/ somewhat support = 43% Strongly/ somewhat oppose = 38%</td>
</tr>
<tr>
<td><strong>Q3</strong></td>
<td>Support or oppose animal research for COVID cure</td>
<td>Strongly/ somewhat support = 57% Strongly/ somewhat oppose = 28%</td>
<td>Strongly/ somewhat support = 54% Strongly/ somewhat oppose = 30%</td>
</tr>
<tr>
<td><strong>Q4</strong></td>
<td>Support or oppose animal research for COVID cure w/ Fauci info in mind</td>
<td>N/A</td>
<td>Strongly/ somewhat support = 60% Strongly/ somewhat oppose = 21%</td>
</tr>
</tbody>
</table>
Love Animals? Support Animal Research

• The work veterinarians did to correct hip dysplasia in large dog breeds like German Shepherds paved the way for all human hip replacements today

• Conversely, many drugs developed for humans are now used to treat your pets

• Research with cats helped create cochlear implants – the small electronic devices that help with hearing loss

• Farm and companion animals with reproductive problems benefit from fertility drugs, including human chorionic gonadotropin, which induces ovulation and improves the conception rate in dogs, horses and cattle

• Vaccines to save wild animal populations begin in animal models
The Foundation for Biomedical Research (FBR) is America's most experienced, trusted and effective nonprofit dedicated to improving human and animal health by promoting public understanding and support for biomedical research.