Animal Welfare

"Animal Rights" vs "Animal Welfare"

Animal Rights

→ based on the idea that animals have inherent legal and moral rights just as humans do.

animals can't have "rights"

→ implies ability of animals to reason with humans and agree on mutually accepted principles

→ implies lives of all animals, including humans, are equal

but this implies it is unethical to use animals as pets or for any other purpose

eg. food, clothing, recreation, education, research

eg. pets = form of slavery

eg. killing rats or roaches is murder

Animal Welfare

→ any use of animals should be motivated by humanitarian goals

→ we are obligated to minimize pain

we are required to show accountability for our actions

there are many animal welfare movements

need to define "**animal**"

warm blooded vs cold blooded

vertebrates vs invertebrates

does a sponge or an earthworm deserve the same consideration as a primate?

if so, why draw the line at animals
what about protozoa, fungi, plants, bacteria?

Avoiding contact with animal products is virtually impossible

Many uses of animal products are hidden:

   eg. **medicines, film, rubber, ceramics, plastics, paint, perfumes, glue, explosives, cosmetics, shaving cream** all contain materials from slaughter houses

   eg. **cellophane** → made with animal fats

   eg. **freon**→ animal fats used to make it

   eg. makers of **synthetic fibers** use tallow based products to control static cling

   eg. animal based **lubricants** are used in jet engines
   → all flying miles are animal based

   eg. used in **corrosion inhibitors** for oil pipelines

   eg. **cars** manufacture alone:
       galvanized steel body, fan belts, gaskets, anti freeze, hydraulic brake fluid, battery, steering wheel, dashboard, tires

       animal fats and hides are even used in **asphalt** on the roads the car drives on.

Extent of animal products "exposure":

foods ~75%

↓

clothing ~10-20%

↓

soaps & cosmetics ~5-10%
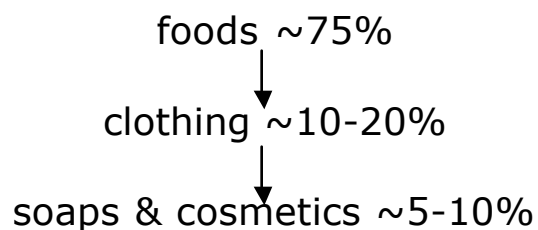
The animal by-products industry brings in $2 Billion/yr

eg. 1000 lb steer:

        432 lbs retail beef

        568 lbs by products

                27 lbs: variety meats; hearts, livers, brain, tongue, kidneys

                358 lbs hide, hair, bones, horns, hoofs, glands and organs

                46 lbs blood

                183 lbs fat

eg. hide: $50-$75/hide

→ US sends 90% of hides overseas for fabrication then back to US for product sale

hide: clothing, insulation, ointment base, binder for plaster and asphalt

hair: toothbrush bristles, mattresses, air filters, upholstery covers

hair from inside of cows ear
→ "camel's hair" paint brushes

eg. hides and connective tissues, cartilage, blood, bones:
glue in plywood, paper matches, textiles, cardboard, window shades

eg. bones, horns, hoofs: gelatin for photofilm and pharmaceuticals (gelatin capsules)

cattle horns: imitation tortoise shell

hooves: white → imitation ivory;
black → potassium cyanide → used to extract gold from ore

eg. bones: electrical bushings, dice, chessmen, crochet needles, piano keys, buttons, knife handles,

bone charcoal is used as refining material to purify

steel, filter sugar cane, manufacture high grade steel ball bearings

eg. blood: dried and used in cattle, turkey and hog feeds; pet food, fertilizers, clotting factors are extracted for pharmaceuticals

eg. glands: >130 different medicines and pharmaceuticals

eg. tallow and lard:
(tallow→ hydrolysis→ glycerine and crude fatty acids→ stearic & oleic acids)
glue, agricultural chemicals, candles, cosmetics, detergents, drugs, metal castings, paints, inks, paper, shaving cream

eg. if animal has **gall stones**
→ in orient $1000-$2000/lb of gallstones
used as aphrodisiac

Animals as Food

by far the largest use of animals (~99%)

→ >10 Billion animals are killed each year for food

including:

9.5 billion chickens turkeys & ducks

42 million cattle

97 million pigs

4 million sheep

also,

an additional 125 million animals are hunted

with estimates that two animals are
wounded/injured for every one killed

Furs

farmed animals provide 85% of furskin production per year worldwide

80 million animals are killed in the US each year

    includes 50 million raised in captivity

    and 30 million hunted

mink and fox are the most common furbearing animals raised on farms

    eg. mink pelt production in the US was 2.6 million pelts in 2002

the US is the world's largest volume producer of furskins derived from wild animals

    there are ~150,000 licensed trappers in the US

    annual (97-98) US harvest by trappers:

otter	29,000
coyote	159,000
nutria	398,000
mink	190,000
red fox	164,000
muskrat	2,183,000
beaver	429,000
raccoon	2,896,000
other	613,000
TOTAL	**7,062,000**

Pets

>100 M mammals are kept as pets

300,000-500,000 from "puppy mills"

Benefits

can improve physical and mental well being

provide companionship

→especially effective for lonely and depressed

but:

→ up to 20 Million cats and dogs are abandoned
each year to starve or be put to sleep

Animal Use in Education

three most commonly dissected vertebrates:

    frogs
    cats
    fetal pigs

9M frogs shipped to US schools (1969)
    ~1/2 live, 1/2 preserved

this is the only animal experience of most students

41% of K-12 teachers report no time spent on live
    animals

only 26% spent >5 hrs/semester on live animals

65% spent >5 hrs/semester on preserved animals

Animal Use in Research

probably one of the most contentious issues with
  animal welfare advocates

Biomedical research is a major enterprise
    US spent $9 B in 1984:

70 M vs 10 Billion killed for food (1.4%)

90% of research animals are rodents bred specifically
    for research

for every dog or cat used in research
    ~100 are killed at shelters and pounds

each year cosmetic and drug companies use millions of
    mice, rats and rabbits to determine the safety of
    chemical they plan to use in their products

        → 20% of all animal use in science('87)

about half of the biomedical research carried out in US
    would not have been possible without lab animals

about 2/3rd's of projects that led to Nobel Prizes in
    Physiology and Medicine used animal
    experimentation

What kinds of research?

animals are used for both basic and applied research

some argue that they should only be used for applied research but you can't separate the two

diagnostics
    1-5% of all lab animals are used to diagnose disease
    eg. TB, diptheria, anthrax, burcellosis, etc

disease models:
    eg. inbred mice for Hodgkins lymphoma
    eg. primates for HIV

organ transplantation:
    eg. tissue typing techniques, immunosuppression
        drugs

bionics research

development of anticancer drugs

determine treatment regimens

minimizing side effects

psychoactive drugs:
    eg. lithium → calming effect on pigs

surgical procedures:
    eg. balloon angioplasty

extraction of medical products
    eg. hormones, blood for culture media

production of antisera, antibodies, & vaccines:
    eg. diptheria, whooping cough, tetanus, polio
    eg. smallpox vaccine from skin of calves or sheep
    eg. rabbits as antisera factories

antibiotic testing

large scale screening of potential drugs and antibiotics

toxicity testing

food and water safety

search for new drugs

in terms of specific animals, the most commonly used animals are preferred because:

easy to handle & maintain
inexpensive to maintain
most appropriate model for a particular kind of research
generally docile
breed quickly
easily acquired from pounds and shelters or purchased from
      internet
easily bred in labs

examples of specific animals used in research:

Mamals:

mice & rats: 95% of all animal research are done on mice and
      rats.

used in virtually every kind of scientific investigations

cows: narcolepsy, reproductive physiology, vaccine testing,
      infectious disease research, heart studies

pigs: very important animal model for human physiological
      studies; cardiovascular research, blood dynamics, nutritional
      deficiencies, alcoholism & drug abuse, general metabolism,
      digestive related disorders, respiratory disease, diabetes,
      kidney and bladder disease, organ toxicity studies,
      dermatology, neurological studies, burn studies, cystic
      fibrosis research

sheep: pregnancy related research, multiple sclerosis, medical implant studies, burn and injury evaluation, smoke inhalation

70% of sheep used in research experience pain

goats: studies in cartilage repair, respiratory physiology, medical diagnostics, gene therapy, anesthetics research, used to produce antibodies, and to produce genetically engineered products

dogs: heart and lung research, transplantation experiments, cancer research, microbiology, genetics, orthopedics, surgeries, vet medicine, toxicity studies of drugs, additives and industrial chemicals

cats: neurological research, spinal cord injury, used to study vision, sleep and hearing problems, Parkinsons disease, cancer, genetic disorders, HIV/AIDS research

50% of cats used in these experiments suffer pain and distress

rabbits: toxicity testing for cosmetics and household products; especially Draize eye & skin irritancy tests
→ very painful
→ rabbits often locked in full body restraints

also used as models for eye diseases, skin, heart and immune system studies, asthma research, cystic fibrosis studies, diabetes and used to produce antibodies for research and diagnosis

guinea pigs: toxicity & safety testing, effects of cigarette smoke, alcohol and drugs, spinal cord injury investigations, TB research, kidney functionk, osteoarthritis research, nutrition and genetics studies, reproductive biology and study of infectious diseases

12% of guinea pigs are subjected to pain and distress

hamsters: taste and vision research, cardiopulmonary research, cancer and muscular dystrophy investigations, studies of aging, asthma, and biorhythms

20% of hamsters are subjected to pain and distress

birds

those used for research are excluded from animal welfare regulations

→no US stats

but: 100,000 birds/ yr in UK and 650,000 birds/ yr in EU are used for research

they are the third most common experimental animal after rodents & fish

fish

some **cold-blooded animals** are also used for research but they are exempt from animal welfare regulation

probably ranges in US from 3.5-7 M/yr

used for biomedical research, toxicity testing, aquaculture, cancer research

What is the value of animal research:

some of this information cannot be learned any other way

→ its unethical to test surgeries or drugs in humans 1st (=human *rights* issue)

→ can set up controlled experiments that you cannot do with humans

> eg. genetically identical pairs
> eg. exact feeding regimes

many surgical and medical procedures used in research had spinoffs in veterinary sciences

> →pets, livestock, zoo animals generally live longer, are healthier and live more comfortably because of animal experimentation

animal experimentation has helped to preserve endangered species :

> treat illnesses,
> eliminate parasites,
> promote breeding (eg. artificial insemination, embryo transfer, capitve breeding)

Are there alternatives?

Criticisms of animal researchers:
a. inadequate self regulation
> only recently have standards of care been dramatically improved; they were slow in coming

> biomedical research has always been closely regulated but really are not many inspections done

b. slow to replace animal models with alternatives

few incentives to change even when alternatives are
available

c. tend to point fingers in other directions

it's the other groups, not us, who are mistreating animals

Criticisms of animal welfare activists:

a. oversimplistic generalizations, loose thinking

eg. animal testing compared to Nazi legacy of human abuses
for "research"

but:
ironic that animal research was almost banned in Nazi
Germany before the war

b. misstatements, misrepresentation of the problem

eg. development of polio vaccine cost 2 M monkeys and
didn't reduce polio rate from 1916 to 1962

but:
polio research only started in 1953
by '70's polio rate dropped to near 0 in US

eg. thalidomide touted as drug that got through animal
testing and still proved dangerous;

also has been stated that many tests were performed
on pregnant animals
but:
actually, didn't get enough animal testing
no pregnant animals were used in research

eg. some believe that all animals suffer agony at some

stage of research

tout statistic that 80% of experiments are done
without anesthetic

but: most didn't require any, there was no pain
involved

c. some antivivisectionists tactics result in more
pain and mistreatment than the research they
oppose

eg. "freeing" lab animals
most will be hunted and killed by wild animals

eg. one group was charged with animal abuse for keeping
over 200 dogs on a 1 acre enclosure to prevent their
use in medical research

d. the "animal rights" movement has:
driven up the cost of research

more money spent on tighter security and to repair
damaged facilities

may slow development of therapies and
treatments

reduces the amount of research being done

some research must be started over when facility is
damaged or animals released

other methods are often cheaper and require less
paperwork: scientists use them when they can

animals are used only when it is the best way to get the appropriate information

> eg. some aspects of the causation, treatment or prevention of blindness cannot be studied in bacteria, fungi or plants → need complex animals

> eg. high blood pressure cannot be studied in invertebrates

still, there is an effort to find alternatives when possible

> eg. may be best to use alternatives for toxicity studies, or do nonanimal tests first then use fewer animals for trials

most researchers hold non-animal experiments cannot completely *replace* animals:

adjuncts not alternatives

Laws

animal experiments are subjected to a wide variety of overlapping laws, regulations, and guidelines

Animal Welfare Act (1966)
> standards for handling, housing, transporting, feeding, vet care, use of pain relieving drugs
> in dogs, cats primates, rabbits, hamsters, etc
> investigators must consider use of alternatives
> allows for unannounced inspections of facilities

Health Research Extension Act (1985)
> human care and use of animals
> procedures established to insure compliance

Animal Facilities must be accredited by **Institutional Animal Care and Use Committee**

There are also state and local laws against animal cruelty

Pain

probably one of the biggest concern is causing pain to animals

most animals are capable of experiencing pain

→ generally scientists acknowledge and accept that all warmblooded animals and most coldblooded vertebrates (frogs, fish, etc) experience pain

even though experiencing pain, many animals may not show any external signs of pain

animals that show distress in nature might attract a predator

eg. recent evidence has shown that even fish have pain receptors and experience pain when caught on fishing line

one simple test for pain:

"a stimulus is said to be painful if it is consistently terminated or escaped by subject"

animals tend to begin to escape pain sensations at

about the same intensity that humans begin to report pain

Most animals experience only minimal pain in research settings:

eg. Animal Welfare Enforcement Report (1988)
94% of all lab animals are not exposed to painful procedures or given drugs to relieve any pain

6% are exposed to painful procedures which are usually not severe or long lasting

eg. Biomedical Research Study (1989)
58% experienced no pain, received no pain medication
35% received anaesthesia → little or no pain
 7% experienced significant pain

eg. there are safeguards to insure animals for research are well cared for:
→ unhealthy animals can lead to eroneous results
→ animal research is expensive; can only afford high quality research
→ pain can invalidate an experiment because stress induces physiological changes in virtually all body systems

some kinds of research subject animals to considerable pain:

eg. orthodontic research

eg. car crash studies
originally used human cadavers, but their use was banned

eg. oral radiation research

subject animals to enough radiation to cause death

eg. tumor therapies

there are also cases of:

inadequate use of anaesthesia and

inadequate care of laboratory animals

Alternatives to Animal Testing

2006: beginning to develop the first realistic software models of human and animal organs

can show thousands of molecular interactions

can manipulate physiological processes

modelers agree that still, some degree of animal testing will be needed; but new models can definitely reduce the need and extent of animal testing; some have doubts due to complexities of living sysstems

Additional perspective on animal welfare:

→ up to 20 Million cats and dogs are abandoned each year to starve or be put to sleep

→ many more pets and farm animals are neutered, some without anaesthetic, than are subjected to experimental surgery for research

→ habitat destruction kills many **millions** more of animals, and whole species are lost, yet this is NOT the major issue with "animal rights" advocates