



Frontiers in Animal Health, Genetics & Food Safety

Global Alliances

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Pfizer Animal Health





PAH – A Leader in Animal Health

- ❖ **2008 revenue \$2.8 billion**
- ❖ **4,000+ colleagues worldwide**
- ❖ **More than 700 colleagues are veterinary R&D scientists and specialists**
- ❖ **Products and services in livestock, poultry and companion animal**
- ❖ **Operations in 60 countries**

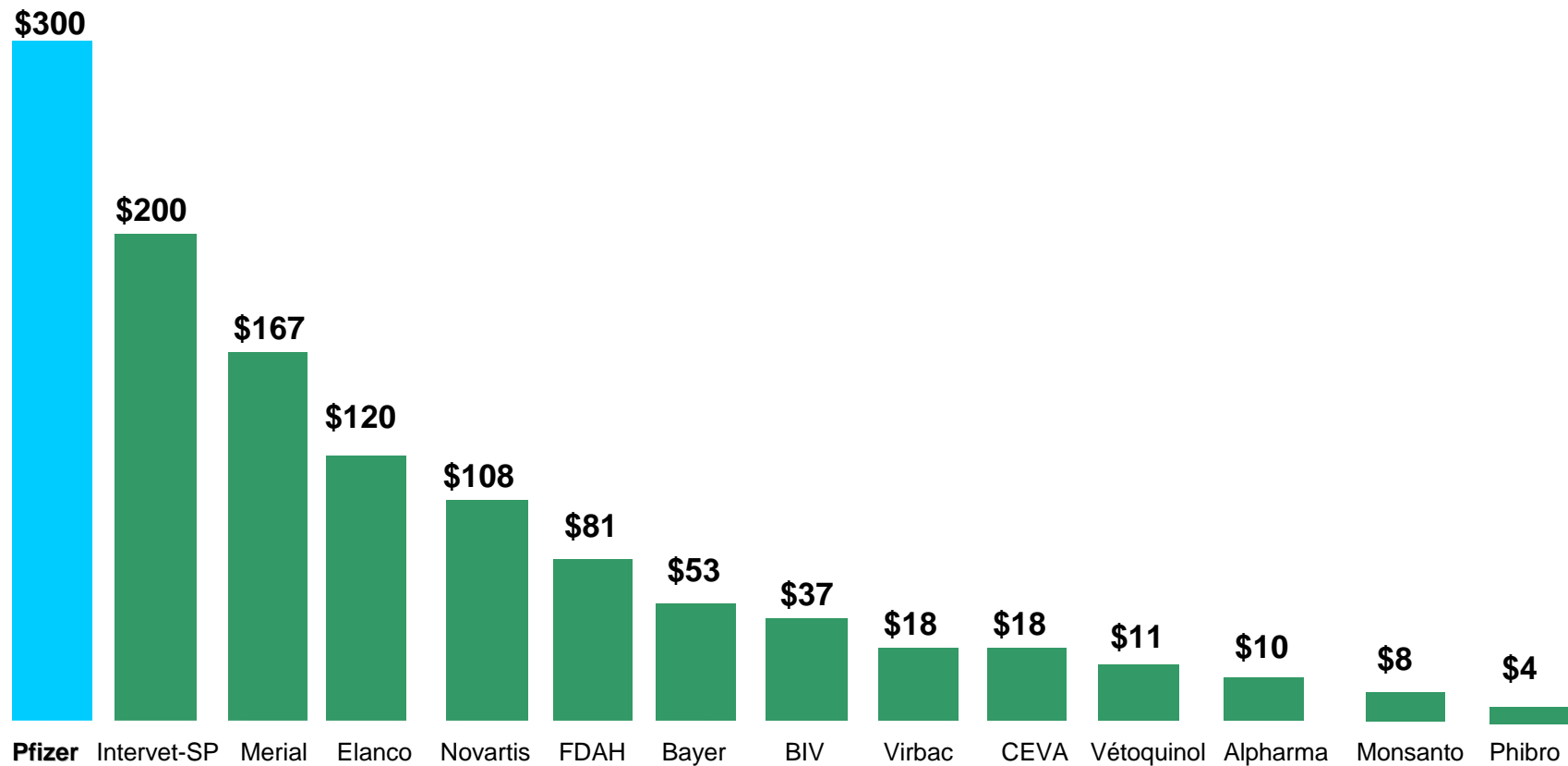
We're focused on disease prevention through our portfolio of animal vaccines and animal prescription medicines.



PAH – Meeting Customer Needs Globally



Pfizer Animal Health and the Industry... 2008 Global R&D Investments in millions



Source: Vetnosis Income Statement Report, released April 2009



Global Alliances

Enhance the Pipeline

Establish candidate-producing collaborations that lead to the identification of new targets, leads, antigens, strains, models

Bolster R&D Productivity

Enhance drug discovery and development by establishing partnerships characterized by speed, attrition, quality

Improve Efficiency and Cost

Leverage scale and invest in key external collaborations and co-funding opportunities

Support Core Business

Support regional business needs and in-line product extension and new indications discovery

Have Access to the Best Science

Establish and maintain cutting-edge scientific relationships and have access to most innovative science outside of PAH



Animal Health, Genetics & Food Safety

- **Current Trends and Observations**
- **Frontiers**
 - **Animal Health**
 - **Genetics**
 - **Food Safety/ Quality**
- **Future**

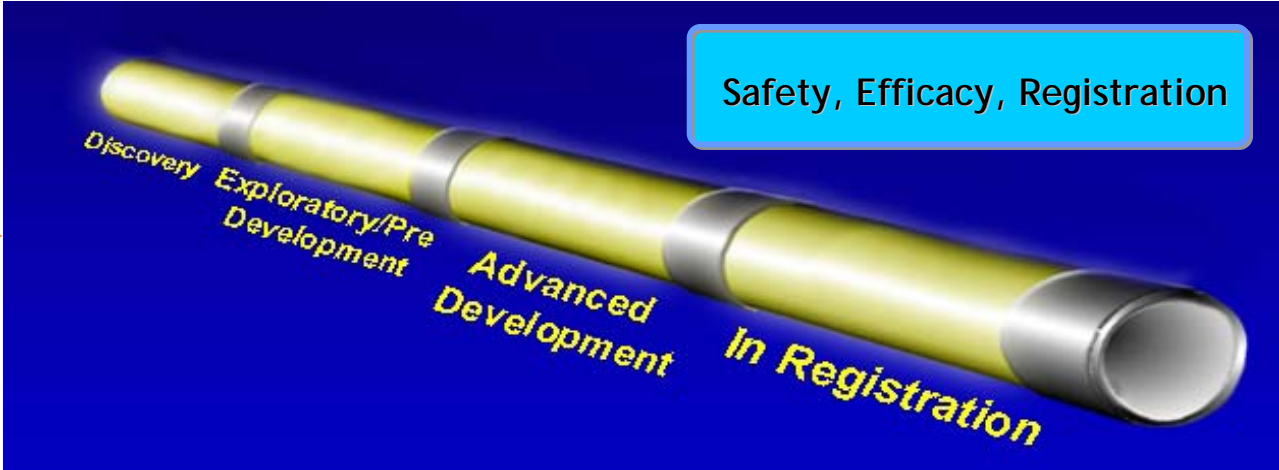


Detection

Monitoring

Surveillance

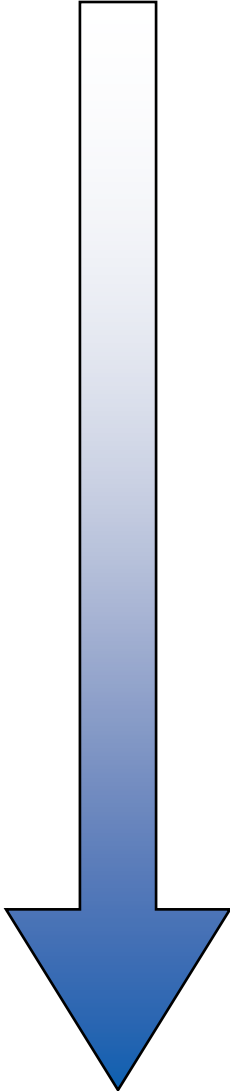
Idea Generation



Distribution



2-10+ years





Feeding The World

Global Production of meat and milk is projected to more than double from 2000 to 2050



livestock's long shadow

environmental issues and options



... the livestock sector is socially & politically very significant.

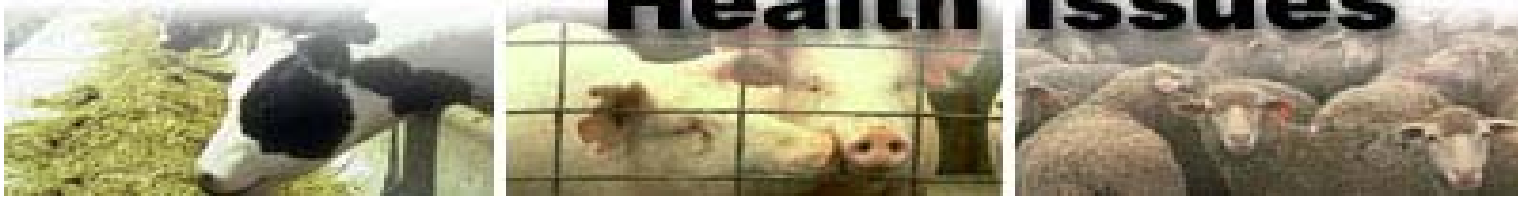
- It accounts for 40 % of ag GDP.
- It employs 1.3 b people
- It creates livelihoods for 1b of the world's poor.
- Livestock products provide 1/3 of humanity's protein intake

Livestock's impact on:
Geographic transition
Climate Change and Air Pollution
Water depletion and pollution
Biodiversity

Food and Agriculture Organization of the United Nations, 2006



Livestock and Human Health Issues



“Administration Seeks to Restrict Antibiotics in Livestock”

NY Times July 14, 2009



Consumer Acceptance of New Technology



**CONTACT THE
FDA NOW!**



**LABEL GENETICALLY
ENGINEERED FOODS!**

Just say NO



To GMO



The BBQ is Over



2009-04-07



“The [FDA] has decided to categorize genetically engineered farm animals, also called transgenic animals, as an animal drug...and will be held to the same requirements already existing for conventionally bred animals treated with hormones or antibiotics.”



Community and Labor



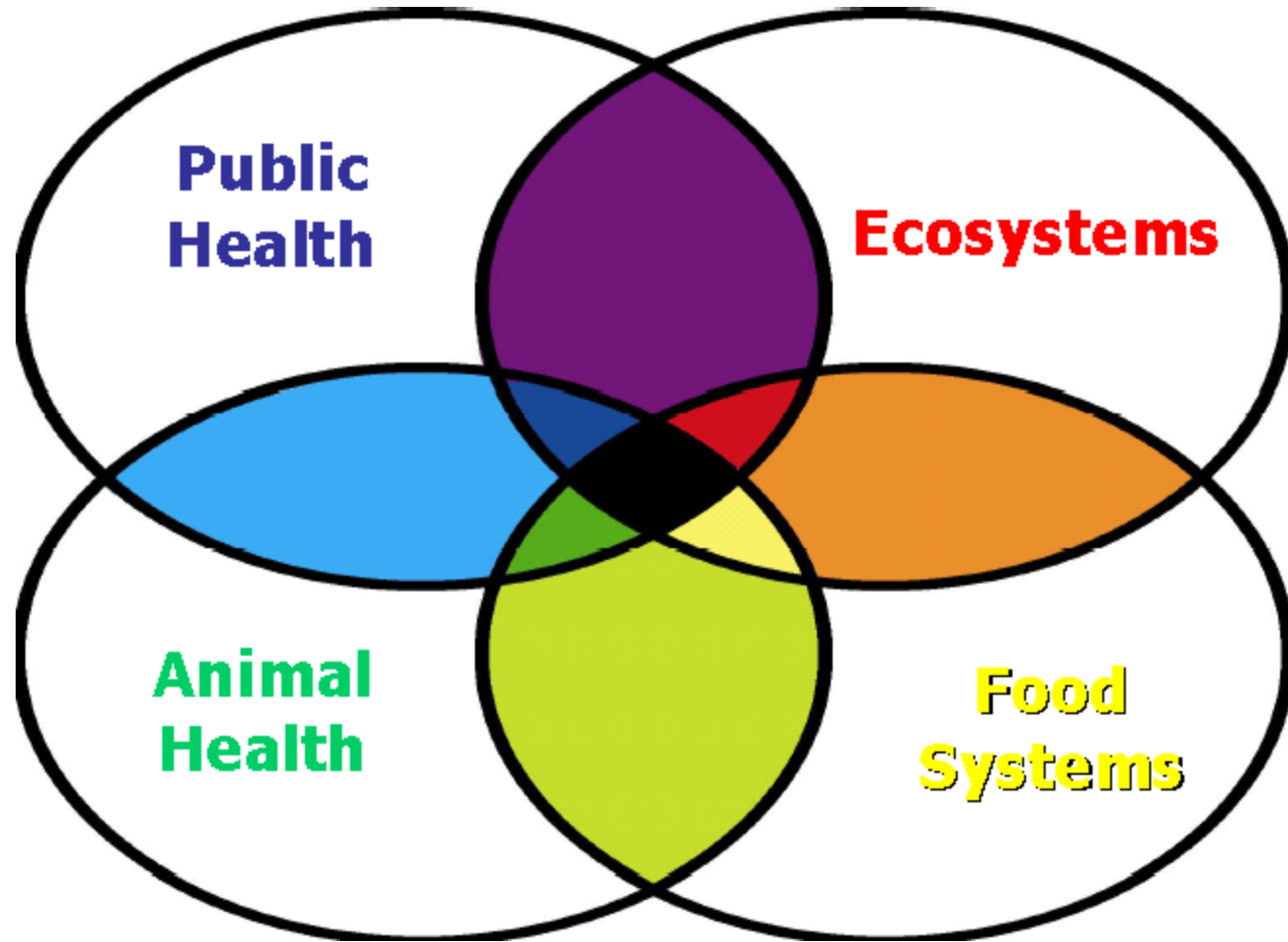
THE HUMANE TOUCH™

Qualifications:

- Proven feedlot management background
- Strong animal health and feeding background
- Need to be good working with customers, motivating and managing people
- Experience with management trainee program preferred
- Strong in all areas of a progressive feedlot
- Routine maintenance and general repair skills



Opportunity for Innovation



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Animal Health Interventions

Consumers

Retailers

Regulators

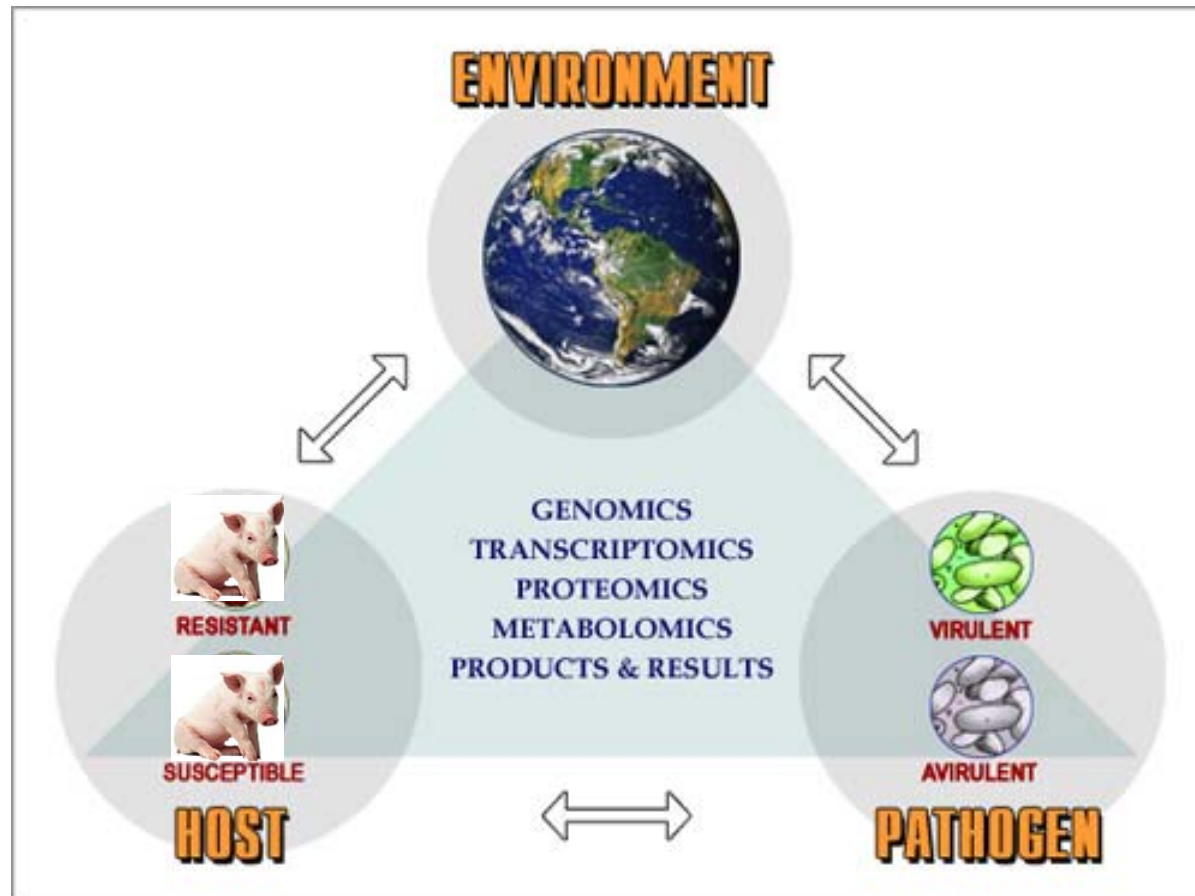
Community

Environmental Impact

Processors

Animal Welfare

World Trade

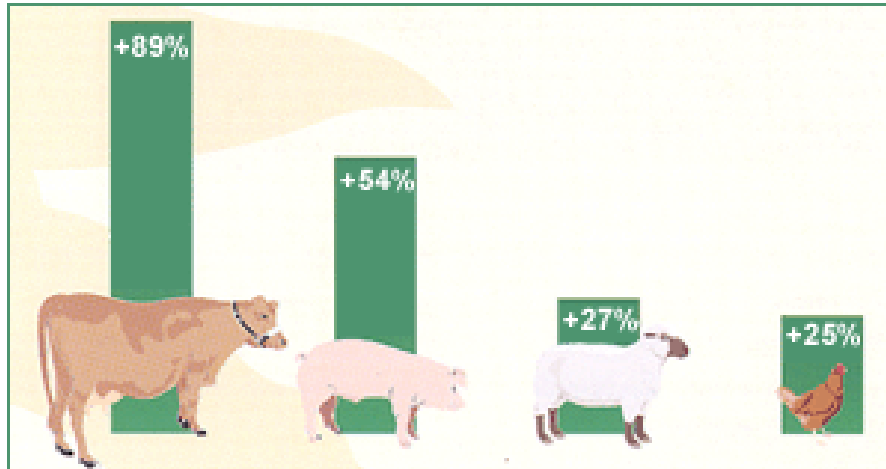


Employee Management

Globalization



Host



Increase in European livestock numbers required to maintain production at existing levels without veterinary medicines.

http://www.apha.ie/about_environment.asp

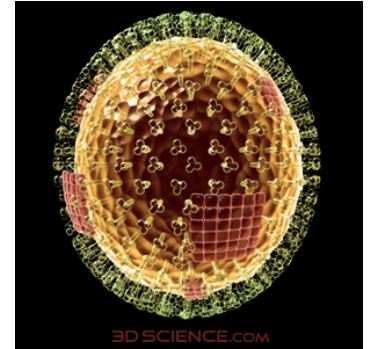
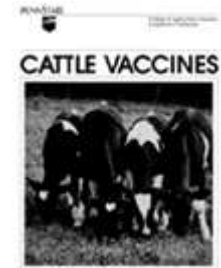
- **Focus on prevention vs. treatment**
 - **Judicious use of antimicrobials**
- **Vaccines**
- **Biopharma**
- **Performance Optimization**



Veterinary Vaccines

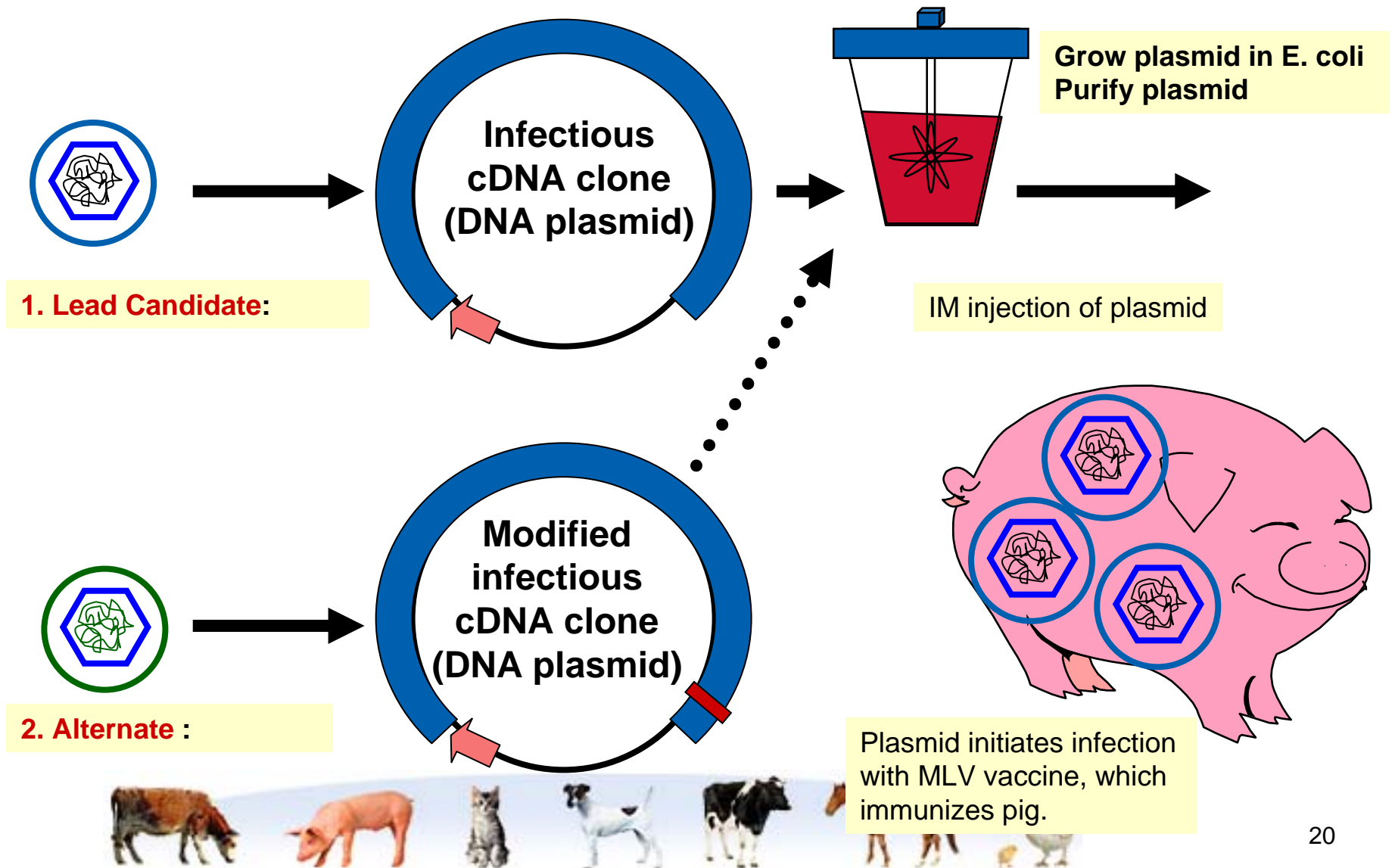
Viral or Bacterial:

- Conventional Live & Inactivated
- DIVA
- Subunit Vaccines
- Genetically Engineered
- Live Viral Vector
- DNA Vaccines
- Parasite



DNA Vaccines – Improved Safety and Efficacy

The infectious cDNA clone strategy (direct DNA delivery of an MLV virus)



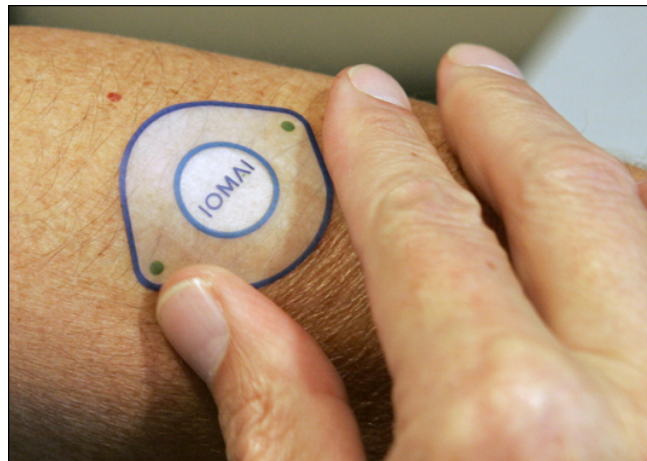
Biopharma

- Proteins (including antibodies)
- Nucleic acids (DNA, RNA)
- **Improvac/Equity/Canine IC**
 - Antigen – GnRH (GnRF)
 - Impact on testosterone (disease?)
- **Atopy (disease)**
- **Obesity (disease)**
- Immune stimulation
- Growth promotion....



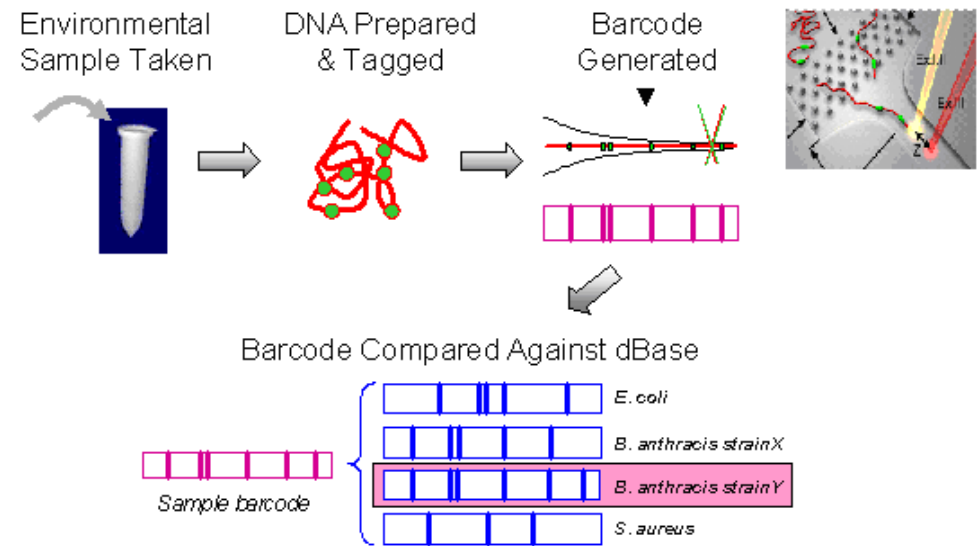
Delivery Devices

- Oral or Aerosol
- Implantable vaccine pellets
- Slow or pulse release
- In ovo
- Transdermal
- Plant origin



Epidemiology, Surveillance and Diagnostics

- Bio-security
- Rapid test diagnostics
 - Genomics
- Emerging Disease surveillance
 - Impact on global trade
 - Vaccine stock pile



Environment

- **Modification of the animal to reduce methane gas production**
 - **Intervention**
 - **Phytase**
 - **Genetic selection**
 - **EnviroPig™**



Uses plant Phosphorus more efficiently



Growth Optimization – Feeding the World



Double Muscles in Bovines

- **Genetics have a defective myostatin receptor.**
- **Defect causes the body to pour most of the energy from the food they eat into muscle production.**



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GeneSTAR[®] Molecular Value Predictions (MVP)

ACGTTTGGATAC
TGCAAACCTATG

ACGTTTGTATAC
TGCAAACATATG

- A measure of the molecular breeding value of a trait, derived from a 56-marker panel (~EPD)
- Traits focus on three core management traits
 - Feed efficiency
 - Marbling
 - Tenderness

It will only be a matter of time before physicians can screen patients for susceptibility to a disease by analyzing their DNA for specific SNP profiles.

Using SNPs to study the genetics of drug response will help in the creation of "personalized" medicine.



Advances in Genetics



- **Genetic Engineering**
 - Involves manipulating genes
- **Genetically Modified Organism (GMO)**
 - organism whose genetic material has been altered
- **Transgenic Animal**
 - carries a foreign gene that has been deliberately inserted into its genome

Questions associated with transgenic technology:

- creation of new life forms & crossing species boundaries
- long-term effects on human health & the environment
- blending of nonhuman animal and human DNA
- unintended personal, social, and cultural consequences





Chinook Salmon



Ocean Pout



Atlantic Salmon



AquAdvantage® Salmon (imagined, not to scale)



The AquAdvantage® Salmon, infertile by design (out of concern they might interbreed with other species), would be the first genetically-engineered animals to be made available as food.



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Food safety in the age of recalls: What the government is doing to protect us, and what you can do

BY [ROSEMARY BLACK](#)

DAILY NEWS STAFF WRITER

Sunday, July 19th 2009, 4:00 AM



With the threat of e. coli, plus several massive food recalls in the past year, food safety is more of a concern than ever.

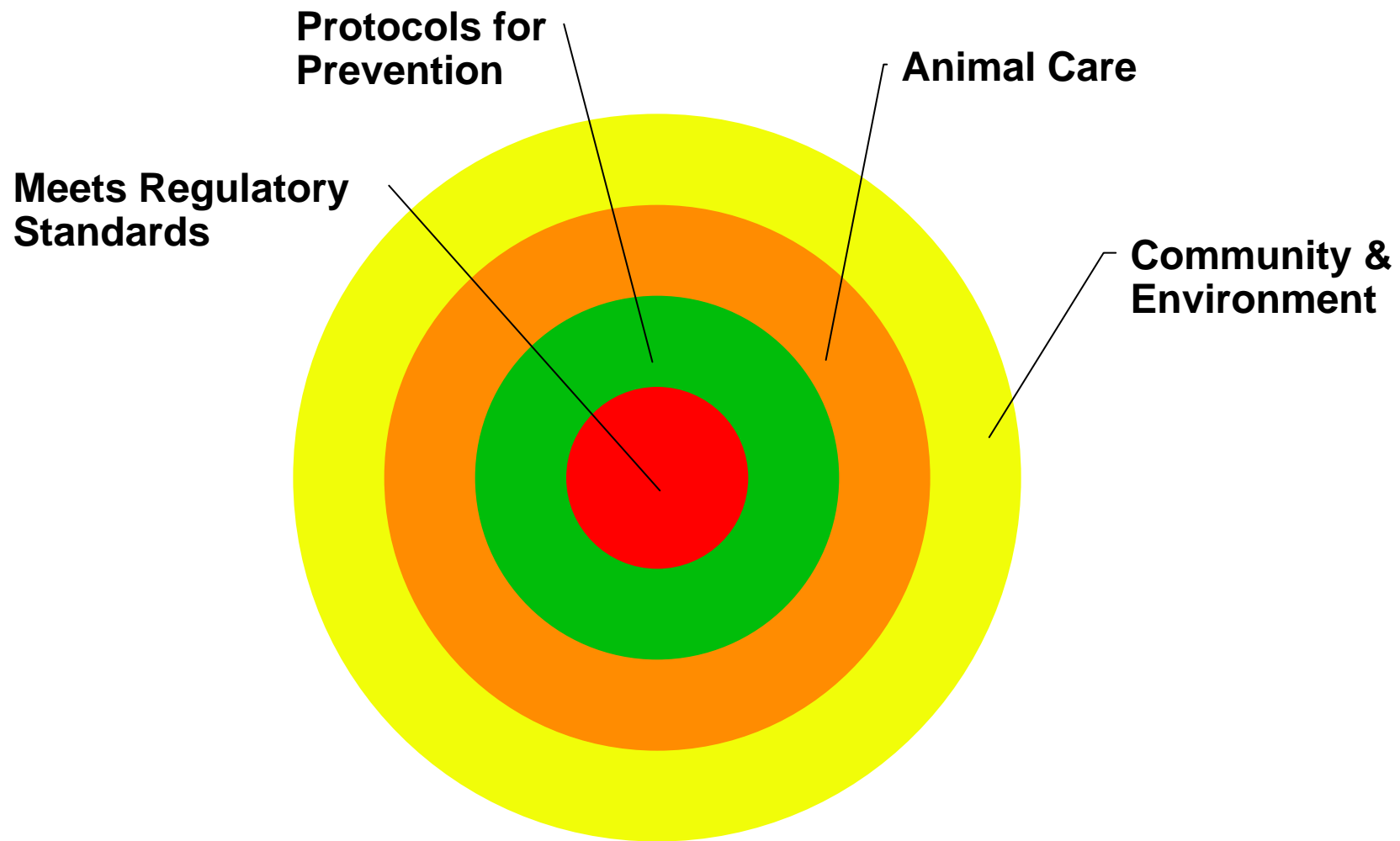


Food Safety

- **Foodborne Microbial Pathogen Control**
 - **Bio-Security**
 - **Diagnostics**
 - **Vaccination**
 - **Post harvest treatment**
- **National Traceability**
- **Veterinary recruitment**



Public Perception & Food Quality



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“Machine vision aids animal management”



Livestock Research

- With the gradual demise of resources publicly available for US agricultural animal research, all stakeholders in the industry need to look for novel and innovative ways to support scientific advancements.



Trade-Offs

Today, world agriculture is called upon to play a variety of roles, in which the trade-offs are considerable and often difficult.. While guaranteeing food security for the global population and a source of livelihood for billions of people, particularly the poor, it must also provide ecosystem services to the wider environment, serve as a sink for carbon sequestration, and meet future demand for biofuels and bioplastics.



Future

- **Technologies are available:**
 - Are they affordable?
 - Are they acceptable?
- **Animal Researchers**
 - Who is going to develop the science?
 - Where will the funding come from?



What trade-offs will need to be made, & who will decide?

