

BBSRC
bioscience for the future

Understanding Open Innovation and its potential impact on vaccinology

Professor Jackie Hunter



Areas for discussion

- What BBSRC funds in animal health
- What is Open Innovation and how relevant is it for vaccinology with some lessons learnt
- What is BBSRC doing to promote an Open Innovation agenda of relevance to veterinary vaccinology

BBSRC has 3 strategic 'grand challenges'



- **Agriculture and Food Security**
 - sustainable and productive agriculture
- **Industrial Biotechnology and Bioenergy**
 - enabling industrial innovation
- **Bioscience for Health**
 - driving advances in fundamental bioscience

BBSRC – Animal health priority

Genetics and genomics
(for production and disease resistance)

Endemic and exotic diseases
(including vector-borne diseases and zoonoses)

Antimicrobial and anthelmintic resistance



Epidemiological approaches and modelling and diagnostic tools

Next generation vaccines

Aquaculture



Infection and immunity

Opportunities from 'One Health'

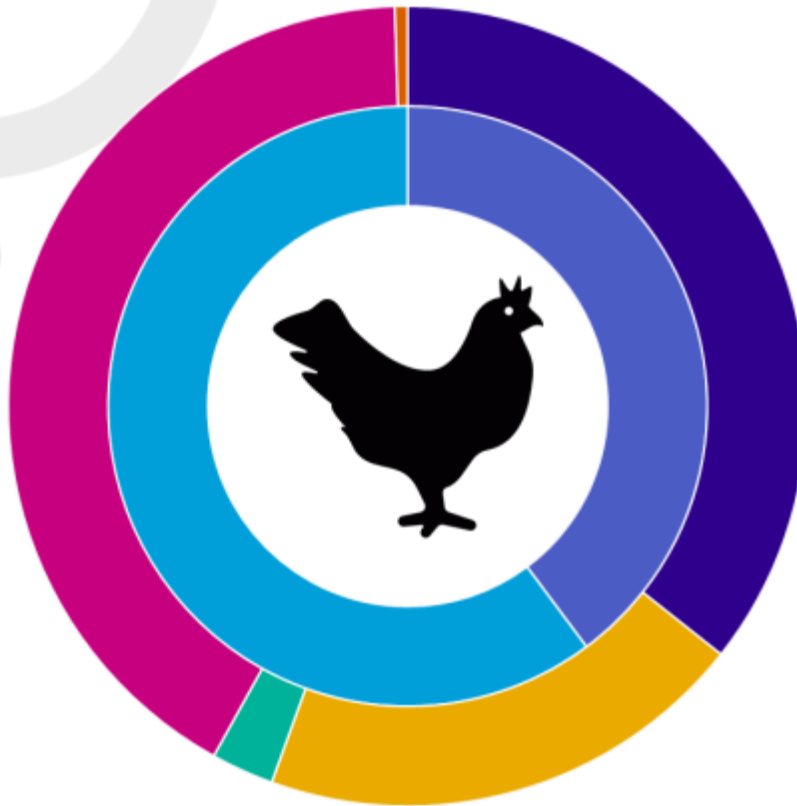
Gut health



Credit: iStock; iStockphoto

BBSRC Animal Health

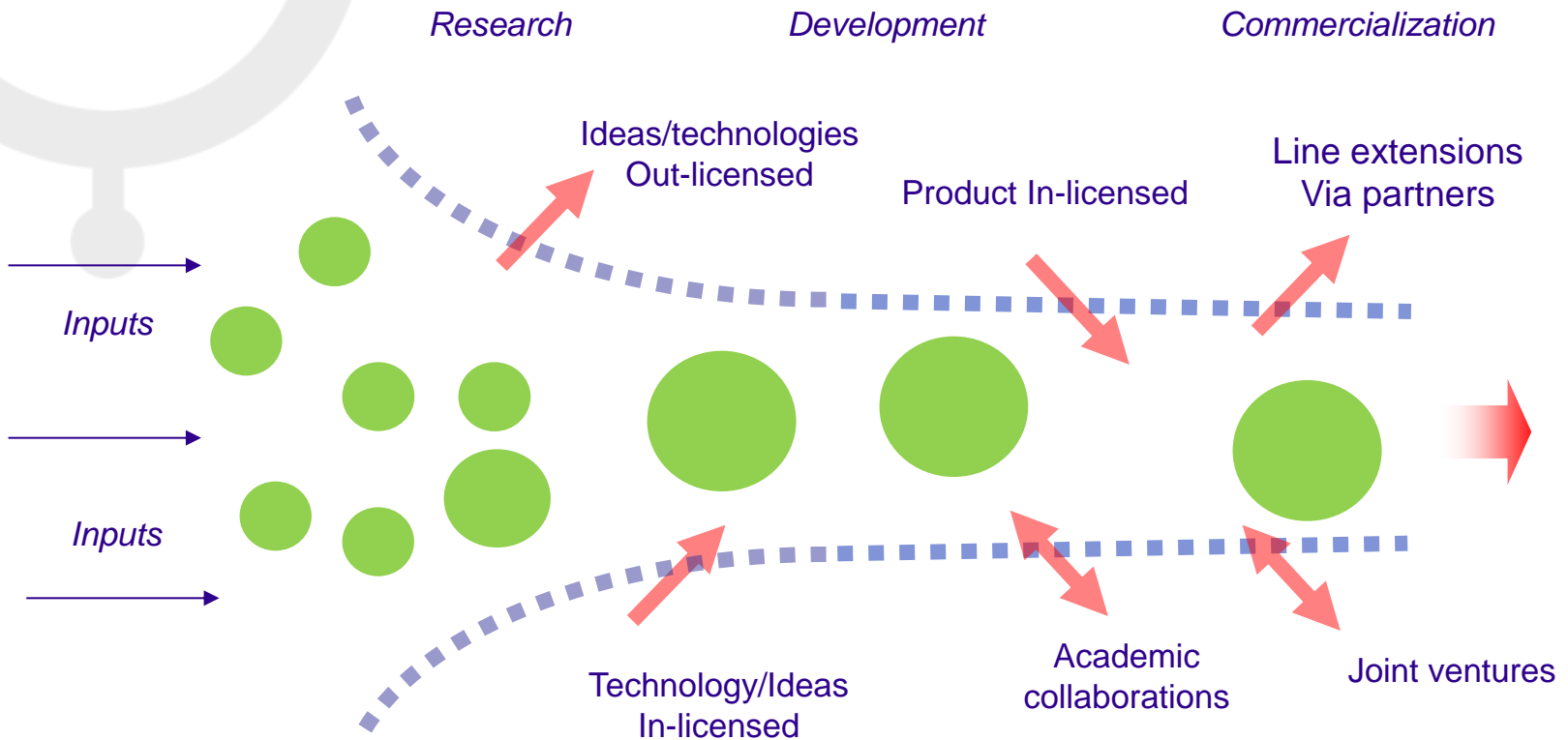
Research spend 2014/15 by research topic and investment mechanism



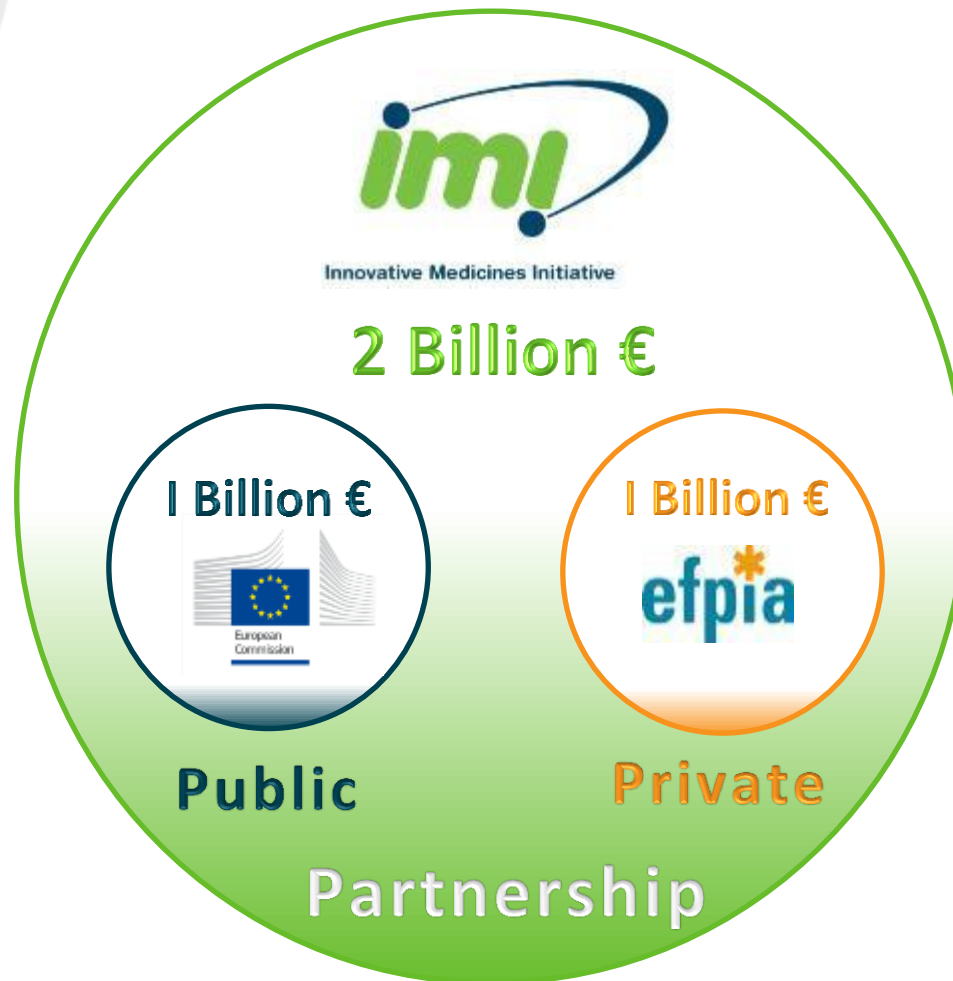
ANIMAL HEALTH £46.0M



Open Innovation from a company perspective



Innovative Medicines Initiative: 2008-2013 with 11 calls and 50 projects funded



Source: IMI

IMI projects



Innovative Medicines Initiative



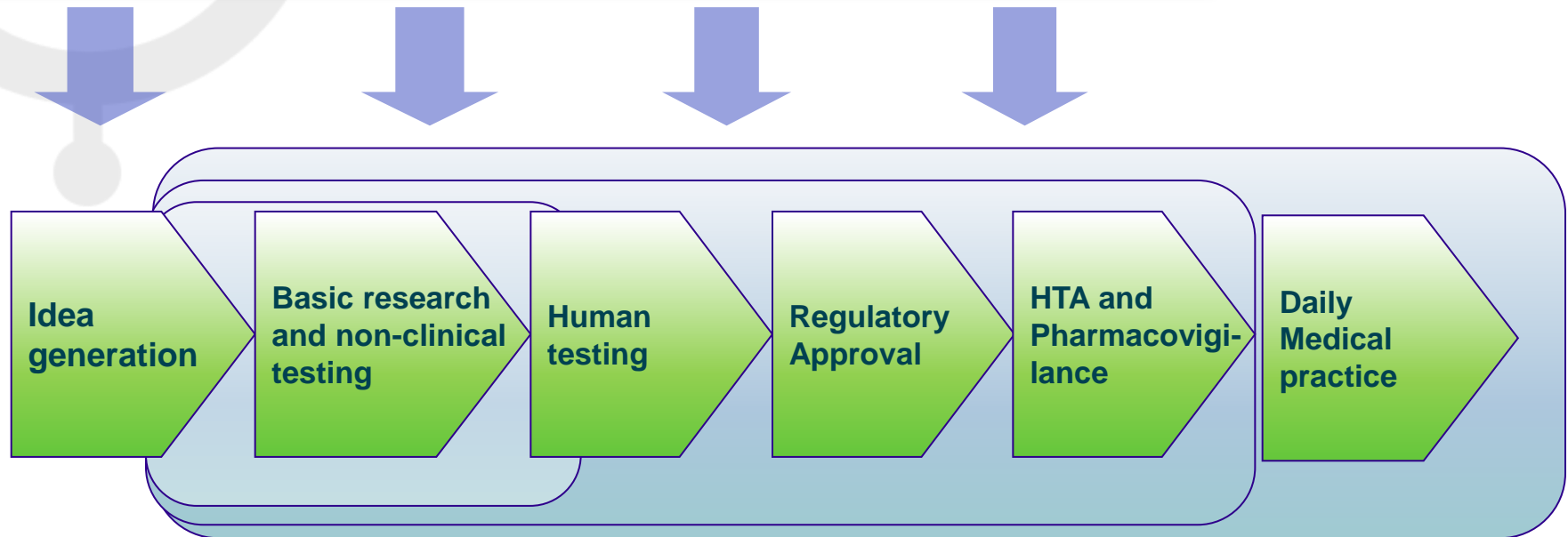
Strategic research agenda

- Comprehensive framework for a 10-year programme
- Prepared with input from 80+ organisations (internet and targeted)
- Project ideas from industry and third parties will be screened against it
- <http://goo.gl/jqMP9g>



The evolution of IMI: From bottlenecks in industry – to bottlenecks in Industry and Society

Make Drug R&D processes in Europe more efficient and effective and enhance Europe's competitiveness in the Pharma sector



Primary focus of early IMI calls
2007 SRA

Shift to addressing challenges in in society and healthcare
2011 SRA

IMI 2 includes real life medical practice
2013 SRA

But similar areas of challenge and opportunity exist in animal health



Abbott Animal Health



What are the challenges and barriers for OI in animal health?

- Companies in sector quite diverse
- European Union regulatory processes and approvals
- Profit margins not as great as some other sectors
- Adoption of new and appropriate tools and farming practices
- Nature of veterinarians and veterinary research collaborations with industry

Areas which might be precompetitive

- R&D
 - Better technology e.g. vaccines
 - Improved diagnostics
 - Orphan diseases
 - Neglected tropical diseases
 - Epidemiology
- Commercialisation
 - Standards
 - Benefit risk assessments
 - Toxicology
- Skills and education
 - Increased knowledge of vets and user community
 - Increased number of veterinarians carrying out research
- Real world utilisation
 - Removing barriers to adoption (regulatory, cultural, etc.)
 - Better measurement of health outcomes

Collaborative best practice: increases chance of success

- Agree goals and objectives upfront
- Cultural fit
- Strong leadership and sponsorship
- Clearly articulate IP and other policies
- Good project management and governance
- Ensure operational clarity and standards
- Exit strategy
- Communication strategy

There are many ongoing public-private initiatives in relevant areas of animal health

- BBSRC funded researchers are involved in some of these initiatives

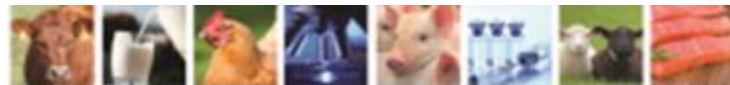


Feed-a-Gene



Models for OI in animal health: animal health research club

- Aims to improve the resistance of farmed animals to pests and disease organisms (this includes cattle for beef and dairy, pigs, sheep, poultry and salmon)
- 12 company members, Scottish Government and BBSRC



ARC • ANIMAL HEALTH RESEARCH CLUB

Veterinary vaccinology network strategy

Vision:

To foster a multi-disciplinary community to enhance the development and uptake of novel tools and technologies as well as address the "unmet" needs in protective immunity in the field of veterinary vaccinology



<http://www.vetvaccnet.ac.uk/>

UK vaccine research and development network

- **Vision** – To develop effective vaccines that help deal with infectious diseases with epidemic and/or pandemic potential
- **Funding** – Department of Health, BBSRC and MRC
£120M (2016-2020)

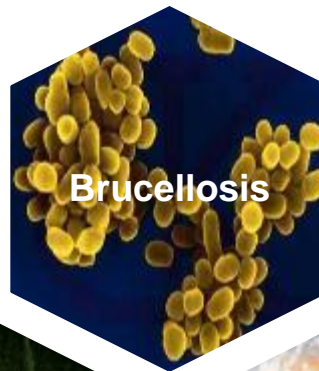
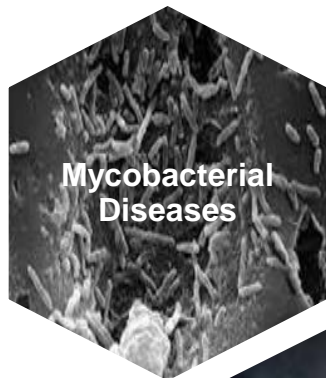




One world one health: Defra leads global coordination of animal disease research

Credit: Dr Alex Morrow

Research priorities



Global coordination in vaccinology

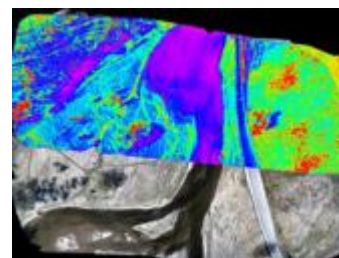
- G20 Ministry of Agriculture Chief Scientists (MACS) Meeting
- A working group to explore the alignment of research priorities and collaboration with the aim of reducing gaps and avoiding duplication, focusing on animal diseases in particular high priority vaccines

Animal and plant science strategy: By 2020

- Real time detection of pests and pathogens
- Direct, sophisticated and rapid responses to prevent and mitigate impacts – increased ecosystem efficiency & effectiveness
- Optimal environment for developing and trialling new interventions:
 - stimulating inward investment
 - development of new products and services by SMEs, large nationals and multinational companies

Creating the connectivity: “the internet of agri-things”

- Create a web of interconnected nodes of e.g. sensors and data collection points and repositories
- Would enable:-
 - Early detection and treatment
 - When and where to intervene
 - Optimise use of fungicides or veterinary pharmaceuticals and reduce input costs
 - Increase productivity and profitability
 - Improved knowledge of host, pathogens and their interactions
 - Enhance preparedness
 - Increase robustness



Three key themes underpinned by “the internet of agri-things”

**Understanding and
controlling pest
and pathogen
burden**

**World-class,
frontier bioscience**

**New technologies to
detect and control
existing problems
and new threats**

**Enhancing the UK’s
ability to validate
and use new
technologies and
methods**

**Integrative
monitoring/
management
strategies for
endemic and
emerging diseases**

**Animal and plant
health systems, from
individuals to
landscapes**

- Interdisciplinary and systems approaches
- Integration of socio-economic approaches
- Exploiting UK capacity and capability
- Greater knowledge exchange
- Exploiting UK capacity & capability
- Partnership

DATA



Conclusions

- Open Innovation is a cultural mind-set and BBSRC is strongly supportive of this approach
- Vaccine technology and its application could benefit hugely from adopting OI principles
- Need to ensure learnings & best practice from previous PPPs incorporated into new initiatives
- Need to co-ordinate efforts both within animal health and between humans and animals in this area