



**Creating Opportunities through Public-Private  
partnerships:  
Collaborative Drug Discovery and the MRCT  
Group activities**

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## MRC: The UK Government's Biomedical Funding Agency

### Mission

- ▶ To encourage and support high-quality research with the aim of improving human health.
- ▶ To produce skilled researchers, and to advance and disseminate knowledge and technology to improve the quality of life and economic competitiveness in the UK
- ▶ To promote dialogue with the public about medical research



*MRC's Watson and Crick astonished the world with the discovery of the structure of DNA*



## Medical Research Council Technology (MRCT)



MEDICAL  
RESEARCH  
COUNCIL  
TECHNOLOGY

- ▶ MRCT is a company, limited by guarantee
- ▶ MRCT is a charity affiliated to the MRC and is responsible for Technology Transfer for MRC Units and Institutes
- ▶ To encourage commercial exploitation for the benefit of health and wealth
- ▶ **A translational research organisation**

## Humanizing Antibodies

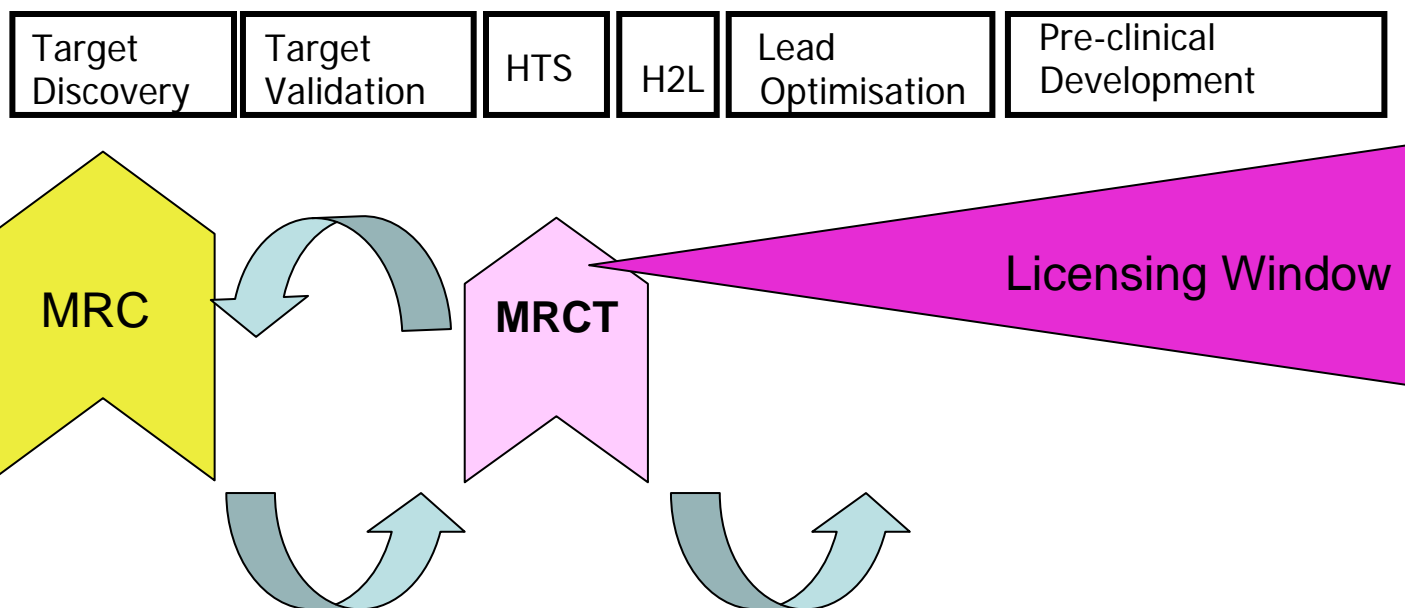
- Therapeutic Antibody Group (TAG)
- >30 antibodies, 11 into clinical trials
  - *Tysabri® (Elan/Biogen Idec)*
  - *Actemra® (Chugai/Roche)*
    - *Recently approved for use in chronic inflammatory disease, a blockbuster!*
  - *Matuzumab (Merck KGaA/Takeda)*
- Key benefits:
  - *Regulatory validation worldwide*
  - *High clinical approval rates*
  - *Expanding market*



## MRCT Spin Out companies

- ▶ 17 Companies spun out of MRC/MRCT
- ▶ 3 examples were:
- ▶ Celltech- acquired by UCB for \$1.8bn
- ▶ Cambridge Antibody Technology- Acquired by AZ for \$1.4Bn
- ▶ Domantis- Acquired by GSK for \$500m
- ▶ Approximately 3000 new healthcare jobs created

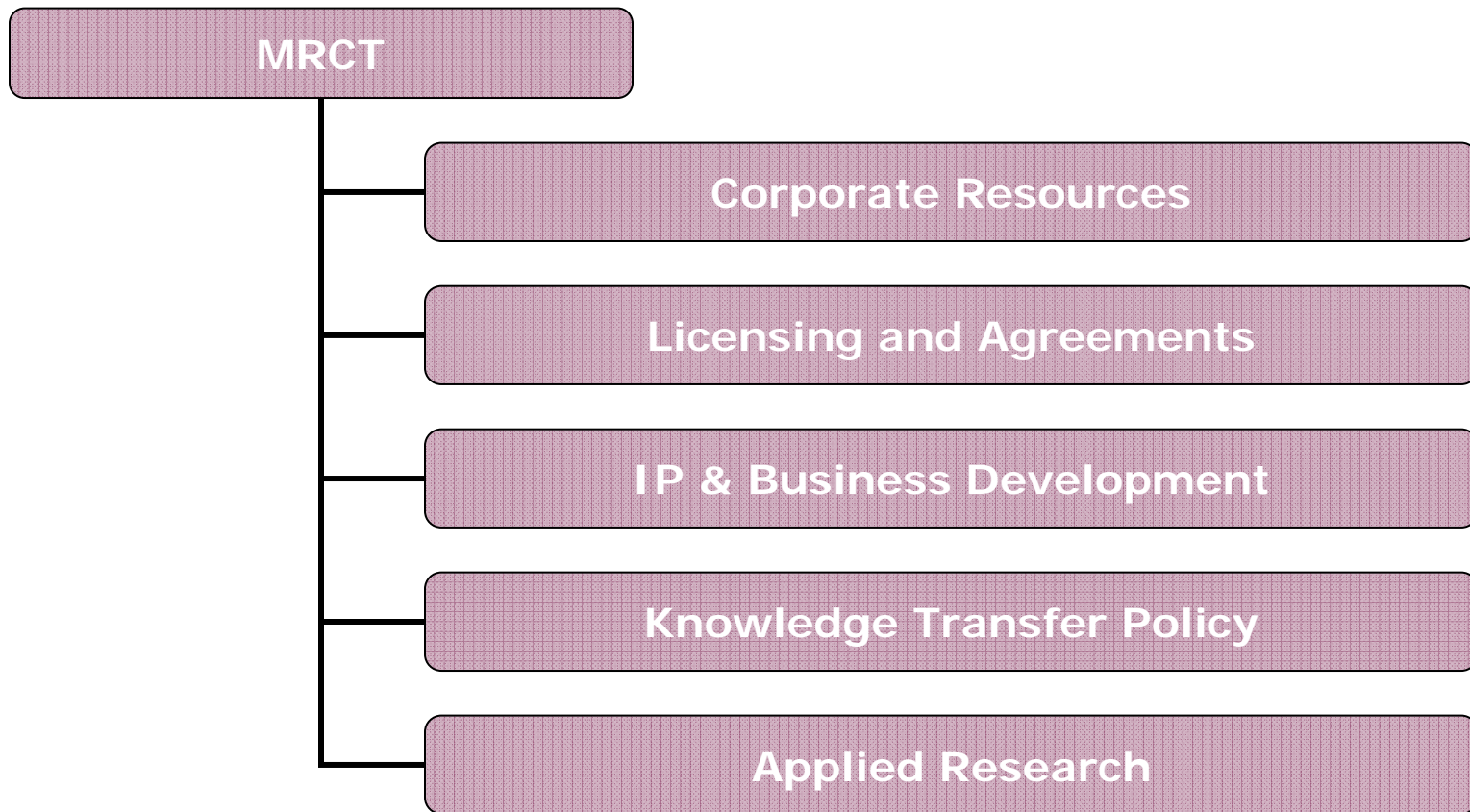
## The UK Centre for Therapeutic Discovery Rationale



## MRCT PERFORMANCE 1998-2008

Year	New filings	New Licenses	Income (£m)
98/99	40	25	2.853
99/00	32	26	7.582
00/01	34	36	17.946
01/02	50	42	11.713
02/03	41	32	14.181
03/04	28	26	15.920
04/05	24	24	22.005
05/06	25	40	141.957
06/07	25	39	64.769
08/09	23	38	67.000
<b>Total</b>	<b>322</b>	<b>328</b>	<b>365.926</b>

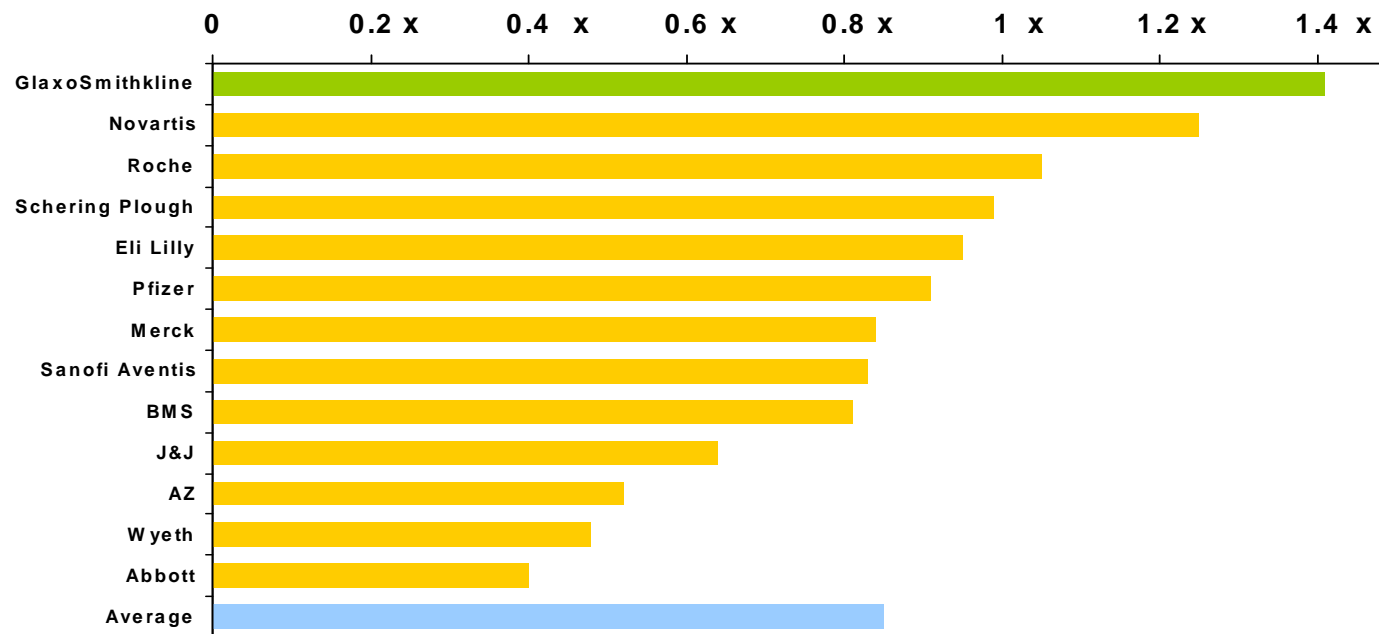
## MRCT – Structure





The productivity problem in big pharma

# Pipeline Replacement Power - Sales



Peak sales of expected Product launches (risk adjusted) divided by 2005 sales

## The Problem!

- ▶ The internal productivity of the large Pharma and Biotech companies is not sufficient to meet the financial targets of these large companies
- ▶ For major Pharma companies 40-60% of their pipeline comes from external In Licensed products
- ▶ This trend is set to grow  
*Companies are spending more of their R and D budget externally and are focussing internal research on later stages in drug discovery*

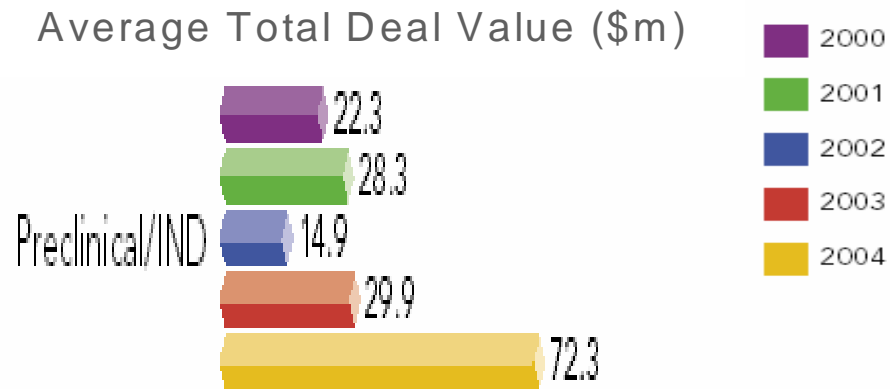


## UK - A World Leader in Innovation

- Europe's top R&D location
- 2nd strongest research base after U.S.
- Collaborations with leading investors in R&D: Boeing, Nokia, Rolls-Royce, Syngenta
- UK government funding for science doubled in last 10 years to current >£4Bn
- Universities generated 25 spinouts in last 3 years – Floated stock market £1.5Bn (combined)
- Home to R&D bases of 2 largest pharma - AZ & GSK
- Pharma R&D high demand - Spend in UK ~£7.5Mn/Day
- Estimated ~20% of world's marketed medicines today come from UK R&D

The potential rewards from licensing deals

## Preclinical / IND Deal Valuations



Source: Data from Windhover's Strategic Intelligence Systems database, Analysis by Burrill & Company

- ▶ This has resulted in several of the top tier pharma companies beginning significant restructuring of their front end discovery operations
- ▶ In the UK the government has become concerned about the impact of this on the biotechnology sector and commissioned a group chaired by Sir David Cooksey to look at what the government can do to stimulate the biotechnology community to be able to respond to the opportunity.

## The Solution

▶ **1. Increased productivity:**

*Decreased time to discover new entities*

*Decreased time to bring them to clinic*

*Decreased Costs*

*Increased product lifetime*

▶ **2. Access to new products- In-licensing**

*Opportunities for small companies and academics*

▶ **3. Access to new technologies**

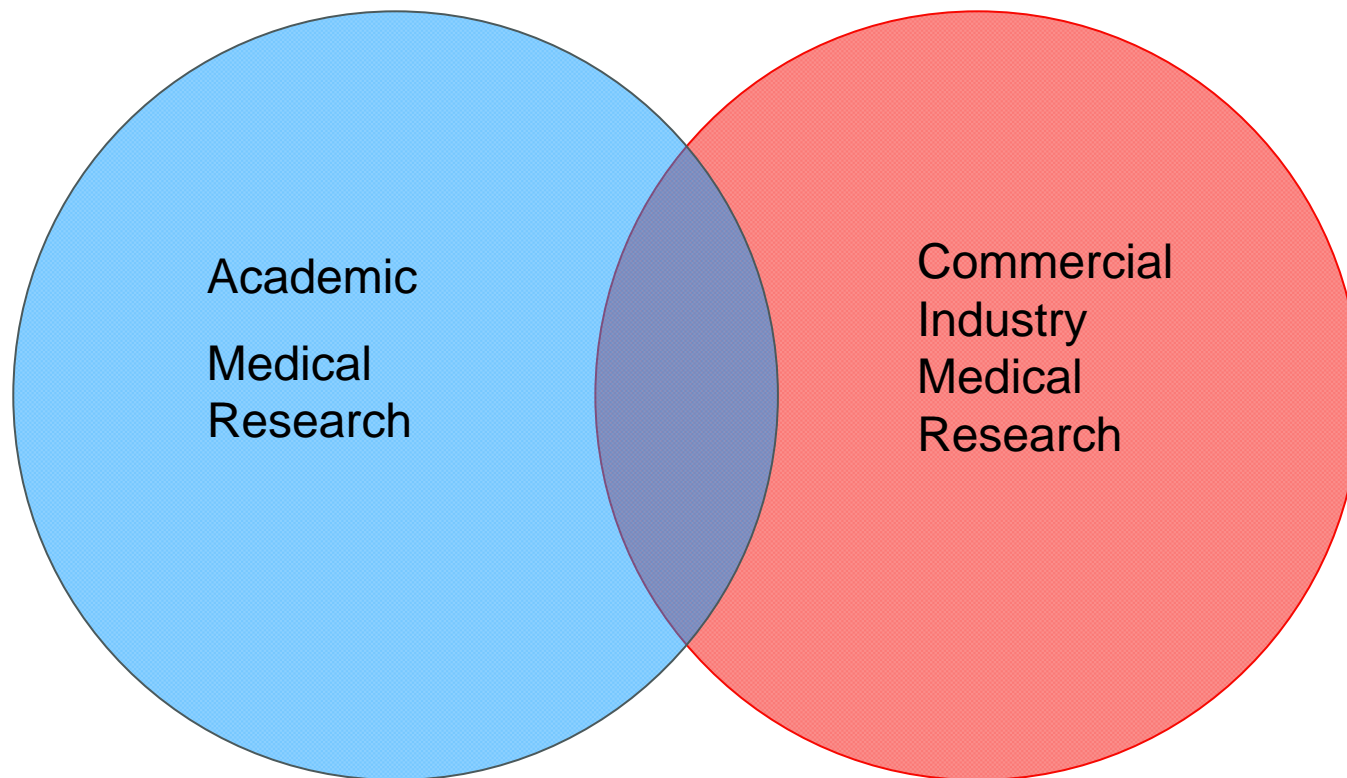
*Staying at the cutting edge of technology*

*Nanotechnology*

## How can academic groups and entrepreneurial small companies help

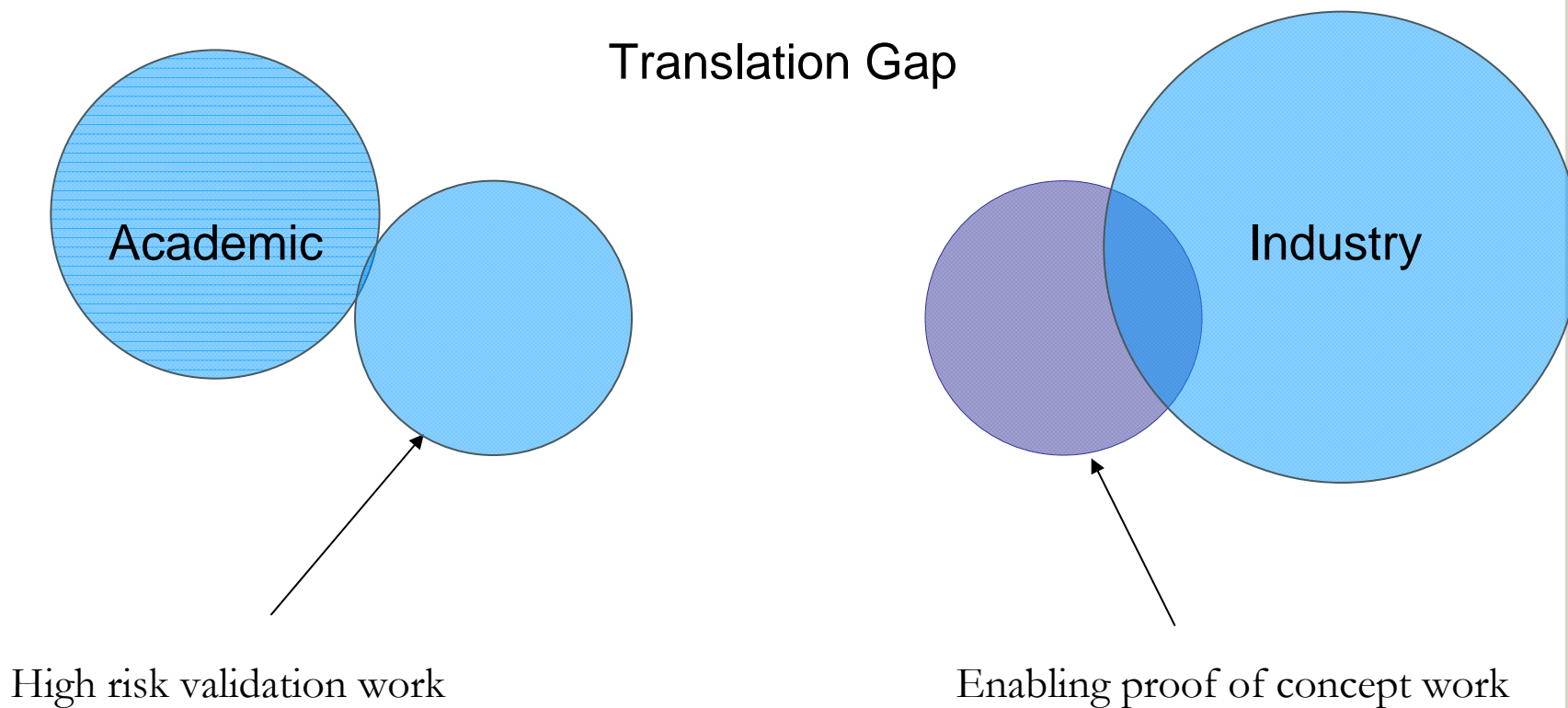
- ▶ Small companies are continually spinning out of universities in the UK and the US to capitalise on commercial needs within the pharmaceutical sector
- ▶ All companies are looking to licence in technologies that meet their needs from academia and spin outs
- ▶ University departments are increasingly looking to carry out their own drug discovery programmes

Previous Situation 1990-2005

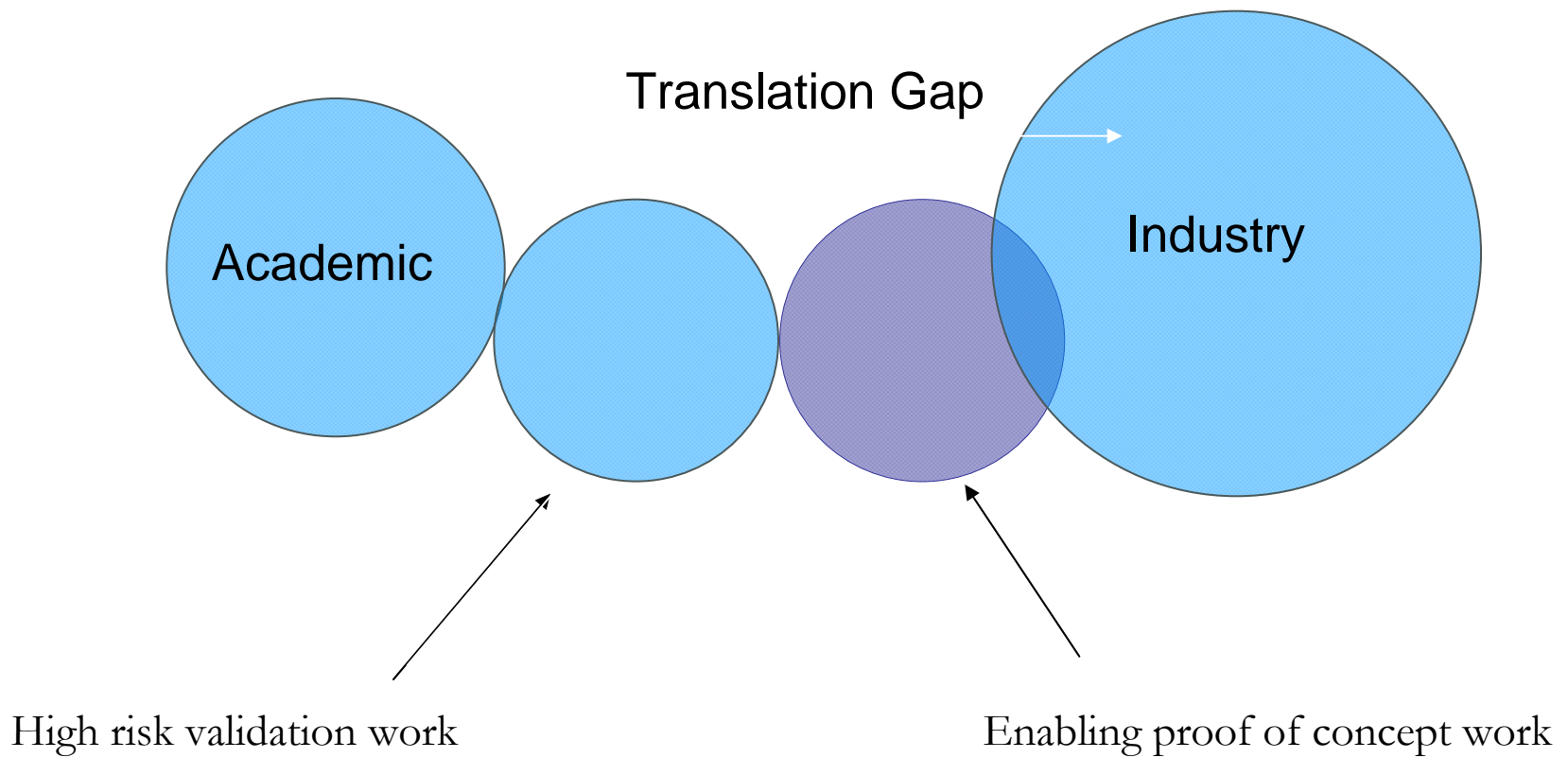




CURRENT



Ambition





### The opportunity for academic and state funded research Groups

- ▶ As larger pharma and biotech companies focus more on late stage research and development activities there is an opportunity for academic groups to be involved in the areas of Target identification, validation and all of the medicinal chemistry activities associated with early stage drug discovery
- ▶ **Translational Research collaborations are the key to unlocking value from basic research!**

How is the MRCT responding to the changing environment?

- ▶ **MAKING KEY IN-HOUSE 'INVESTMENTS' TO ACHIEVE OUR MISSION**
- ▶ Improve Healthcare Nationally and Globally
- ▶ Benefit the UK economy

## A Strategic Investment I

- ▶ **Development Gap Funding**



## Development Gap Fund

- ▶ 'Seed' money operating at early stage of technology transfer & intended to develop and exemplify early-stage ideas
- ▶ Fund managed by MRC Technology
- ▶ £4.5 million committed from 2004-2008, available to MRC scientists for commercial projects
- ▶ Made available from revenues from previous successful commercial activities
- ▶ New fund of £6m for 2008-2011

## A Strategic Investment II

- ▶ **Early Stage Drug Discovery**
- ▶ **Life Science Technologies Technologies**



## Centre for Life Science Technologies Technologies

- ▶ **MRCT's Centre for Life Science Technologies is based in Scotland in Edinburgh**
- ▶ The remit is to identify potential technologies that have applications in Healthcare and consider how to advance these to proof of principle, e.g. prototype



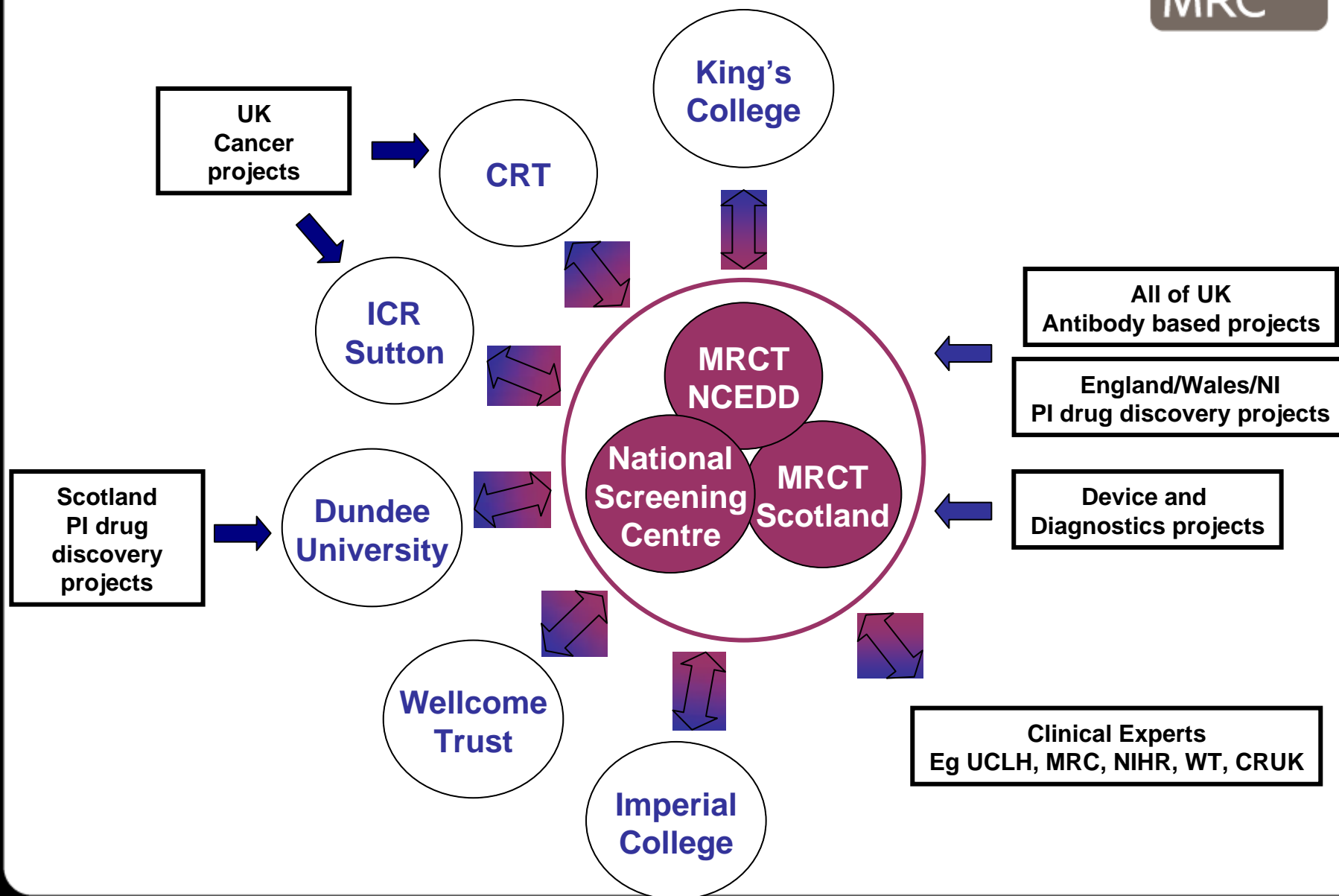
## Centre for Therapeutics Discovery

- ▶ MRCT's **Centre for Therapeutics Discovery** comprises of three integrated arms
  - Assay Development and Screening*
  - Medicinal Chemistry*
  - Therapeutic Antibody Group*
- ▶ Currently 35 scientists growing to 80 over the next 18 months
- ▶ Current annual budget of around £3.5m
- ▶ **The evolution to the UK Centre for Therapeutic Discovery**

## The UK Centre for Therapeutic Discovery Goal

- ▶ Take early stage molecular targets emerging from academic research, for indications where there is a clear unmet need
- ▶ Deliver potent, selective, lead compounds or antibodies with demonstrable efficacy in a disease model for partnering
- ▶ Deliver tool compounds to further PI's research and enhance quality publications and IP around biomarkers and diagnostics

# Possible structure of a National Network of Excellence in DD



## Case Study of a public private partnership

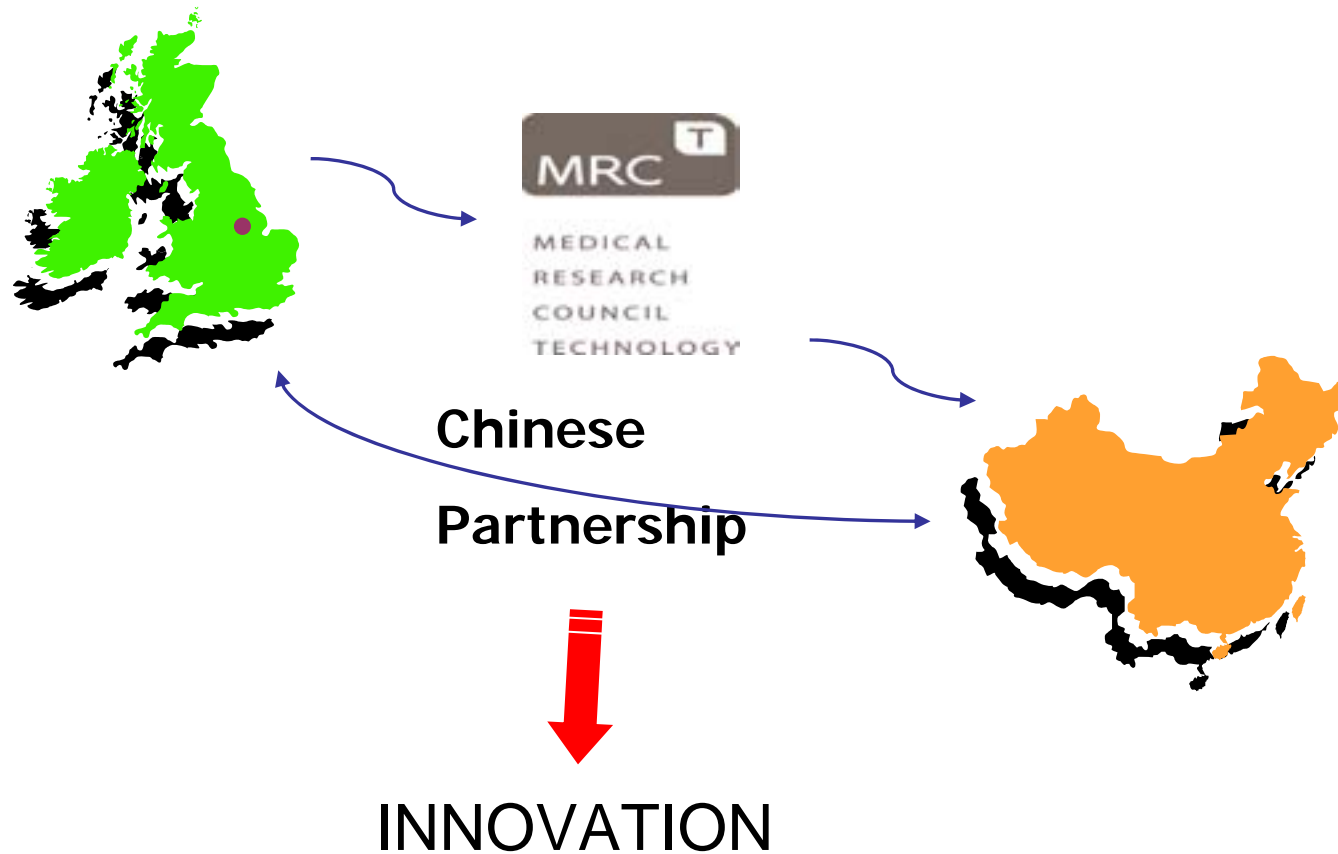
- ▶ GPCR De-orphanisation
- ▶ Three way collaboration between MRCT, GSK and DiscoverX to de-orphanise up to 100 orphan GPCRs
- ▶ Plan is to link de-orphanised GPCRs to disease by tapping into academics with expertise in this field
- ▶ MRCT and GSK provide screening staff, GPCR expertise, compound libraries, robotics. DiscoverX provide cell lines
- ▶ MRCT and GSK can collaborate on de-orphanised targets and progress them into drug discovery for key diseases DiscoverX gain validation for their  $\beta$ -arrestin assay technology

## Case Study of a public private partnership

- ▶ Compound Libraries
- ▶ Agreement in place to access large subsets of Pharma company's library
- ▶ Pharma company provides large libraries for screening against novel targets of interest they select from MRCT targets. MRCT and Pharma progress any hits into hit-to-lead programmes
- ▶ Pharma Co. gains exclusive access to cutting edge biology for the cost of provision of screening plates
- ▶ MRCT gains large high quality compound sets and ready made partner for downstream partnering



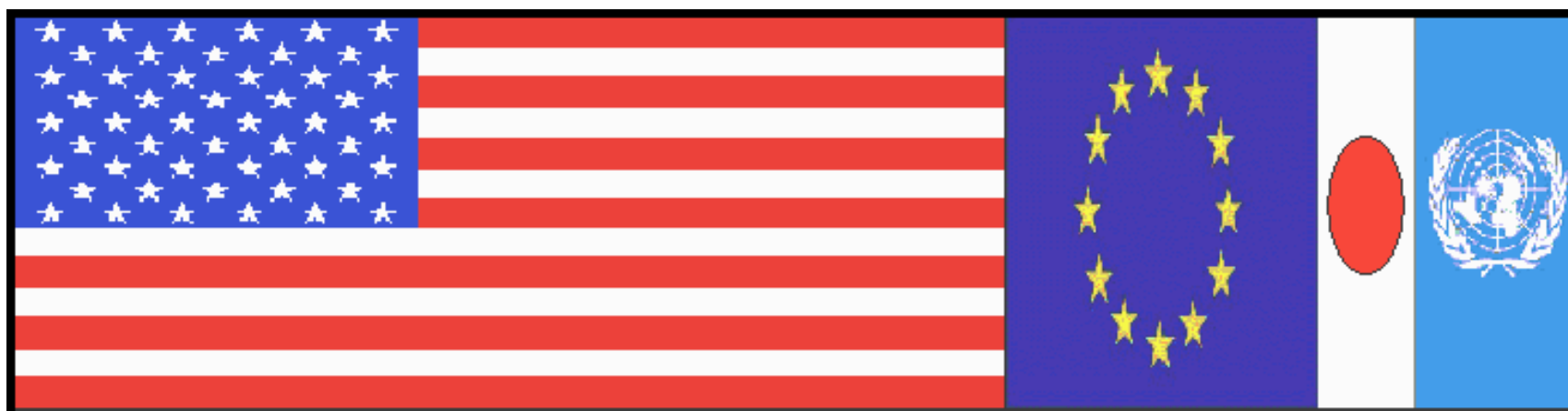
# A Global Solution to a Global Problem A New Business Model



**Both East & West need innovation  
through R&D - HOW?**

## innovation – market penetration

geographical breakdown of main market sales of new medicines launched over 2004 - 2008



**66%**  
**USA**

**26%**  
**Europe**

**3%**  
**Japan**

**5%**  
**ROW**





## top 10 Pharma markets

	sales (\$bn)	share (%)	change (%)
U.S.	291.9	40.6	3.2
Japan	73.7	10.2	3.6
France	39.7	5.5	1.4
Germany	38.9	5.4	3.3
Italy	25.1	3.5	4.0
China	22.2	3.1	24.7
Spain	21.4	3.0	6.5
UK	19.8	2.8	4.9
Canada	17.7	2.5	6.1
Brazil	11.6	1.6	12.1
<b>Totals</b>	<b>\$561.9</b>	<b>78.2%</b>	<b>4.3%</b>

Source: IMS MIDAS, to June 2009



## MRCT proposal for UK-China Partnership

- ▶ Provide a two directional bridge between Europe, the USA and China for drug discovery opportunities
- ▶ Exploit the best science available globally in partnership with China to introduce new healthcare opportunities
- ▶ Ambition is to launch new medicines in Chinese market before licensing rights outside of China to commercial partners
- ▶ **Link the discovery engine of the UK to the development engines of China to create economic growth and healthcare benefit**



## Benefits to UK

- ▶ Retains Pharma R&D
- ▶ Remains a World leader in innovation
- ▶ Strengthens UK – China partnership
- ▶ Improves health
- ▶ **Links the combined strengths of the UK and China to provide a global competitive advantage!**



## Benefits to China

- ▶ Access to R&D required for its Bio-Parks
- ▶ Has training & development facility
- ▶ Link to MRCT to provide Business Development expertise
- ▶ Launch drugs on the Chinese markets - Improved healthcare
- ▶ Reduced NME development time & cost
- ▶ **Moves Chinese infrastructure from low cost to knowledge based economy! From “made in China to invented in China!”**

## Summary: MRCT Translational Activities

- ▶ Funding mechanisms in place
- ▶ Infrastructure capability in place
- ▶ The machine is ready to run
- ▶ Innovative business models being explored

*Identify the partners and projects to work with*

***Closing the translation gap = create value!***



Thank you for your attention