

The UK Drug Pipeline: A Leader in Drug Innovation

Martyn Postle
Cambridge Healthcare & Biotech
BIO2007
6 May 2007



Statistics taken from a CH&B report commissioned by UKTI



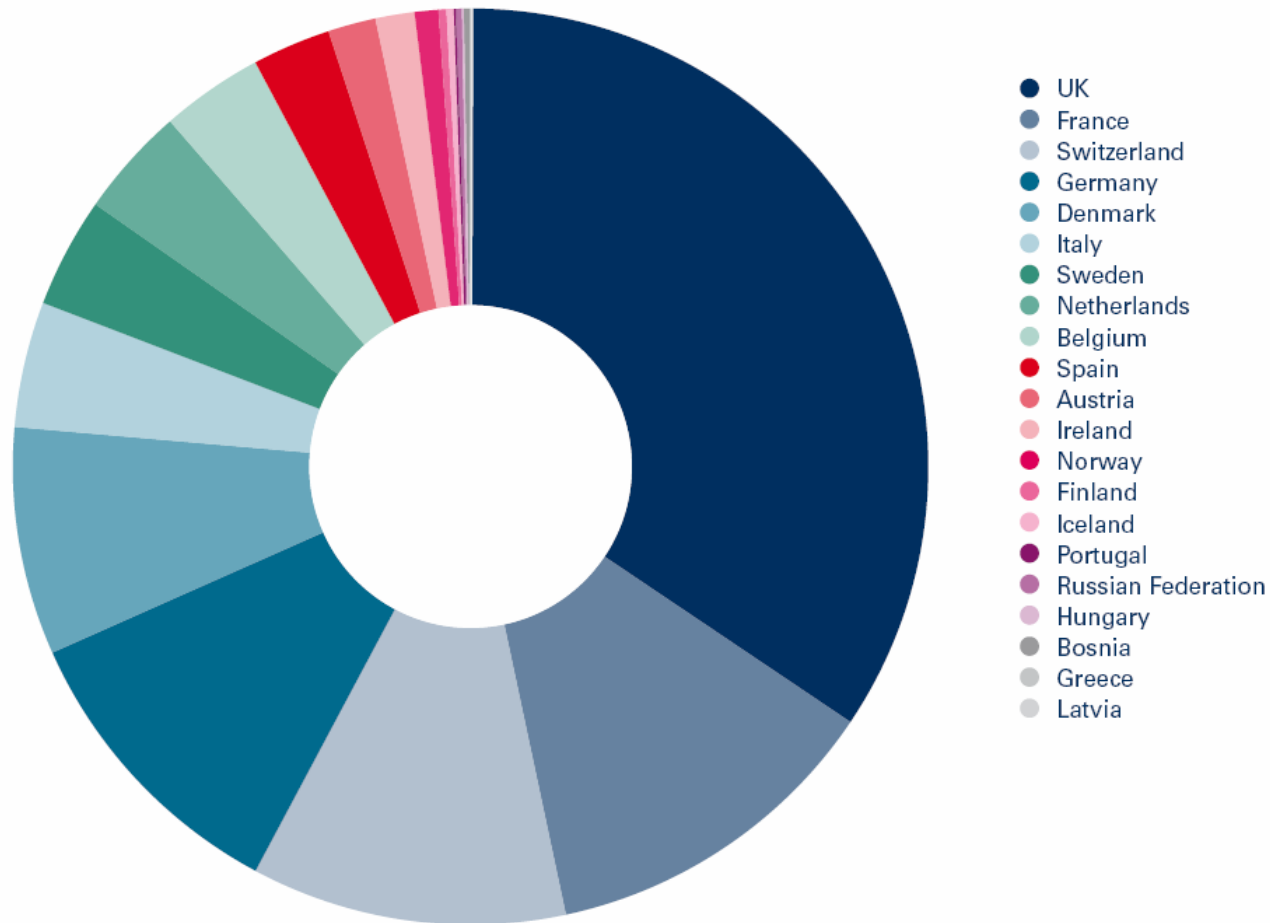
Contains details of 507 products in development from 87 companies

a fraction of the c350 active UK biotech and pharma companies

*Electronic copies available from stand 1773
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UK pipeline- Number 1 in Europe

- The UK has the largest life science R&D pipeline in Europe. Producing 35% of all pharmaceutical products discovered in Europe, the UK is almost three fold ahead of France, the second most important country in Europe for drug discovery.



Source: PharmaProjects & Cambridge Healthcare & Biotech



Perhaps it's because our Universities are so good

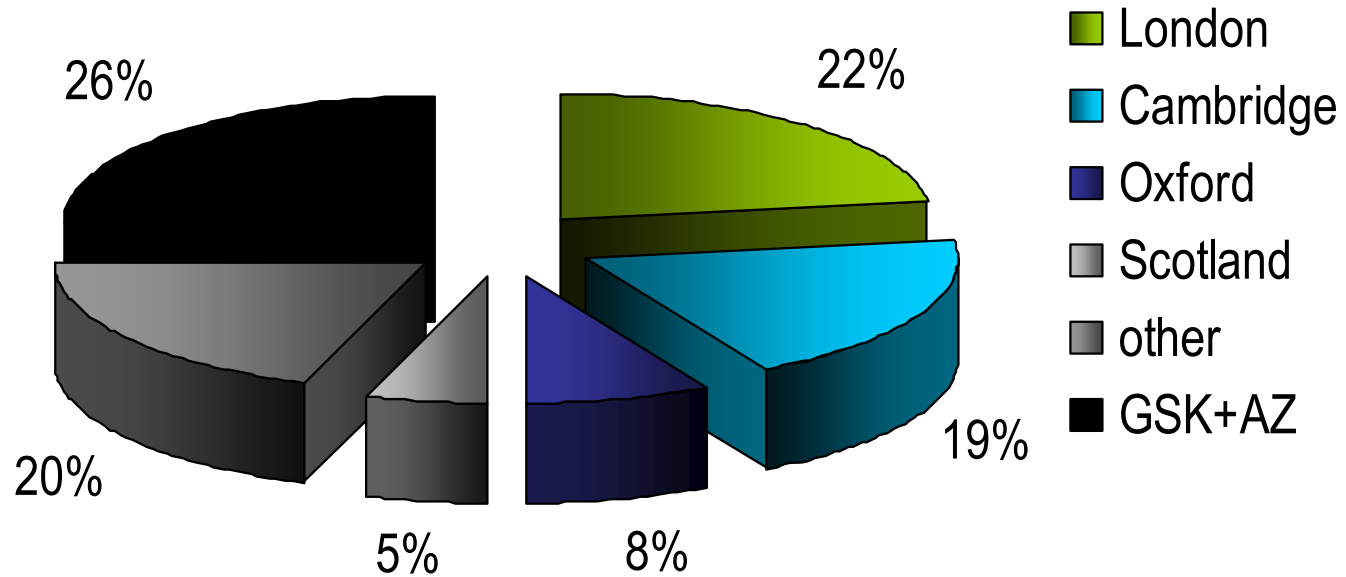
Academic ranking of European Universities

<i>European rank</i>	<i>Institution</i>	<i>Country</i>
1	Univ Cambridge	UK
2	Univ Oxford	UK
3	Imperial Coll London	UK
4	Univ Coll London	UK
5	Swiss Fed Inst Tech - Zurich	Switzerland
6	Univ Utrecht	Netherlands
7	Univ Paris 06	France
8	Karolinska Inst Stockholm	Sweden
9	Univ Manchester	UK
10	Univ Munich	Germany
11	Univ Edinburgh	UK
12	Tech Univ Munich	Germany

Source: Institute of Higher Education, Shanghai Jiao Tong University



UK pipeline: Number of projects by location of originator company



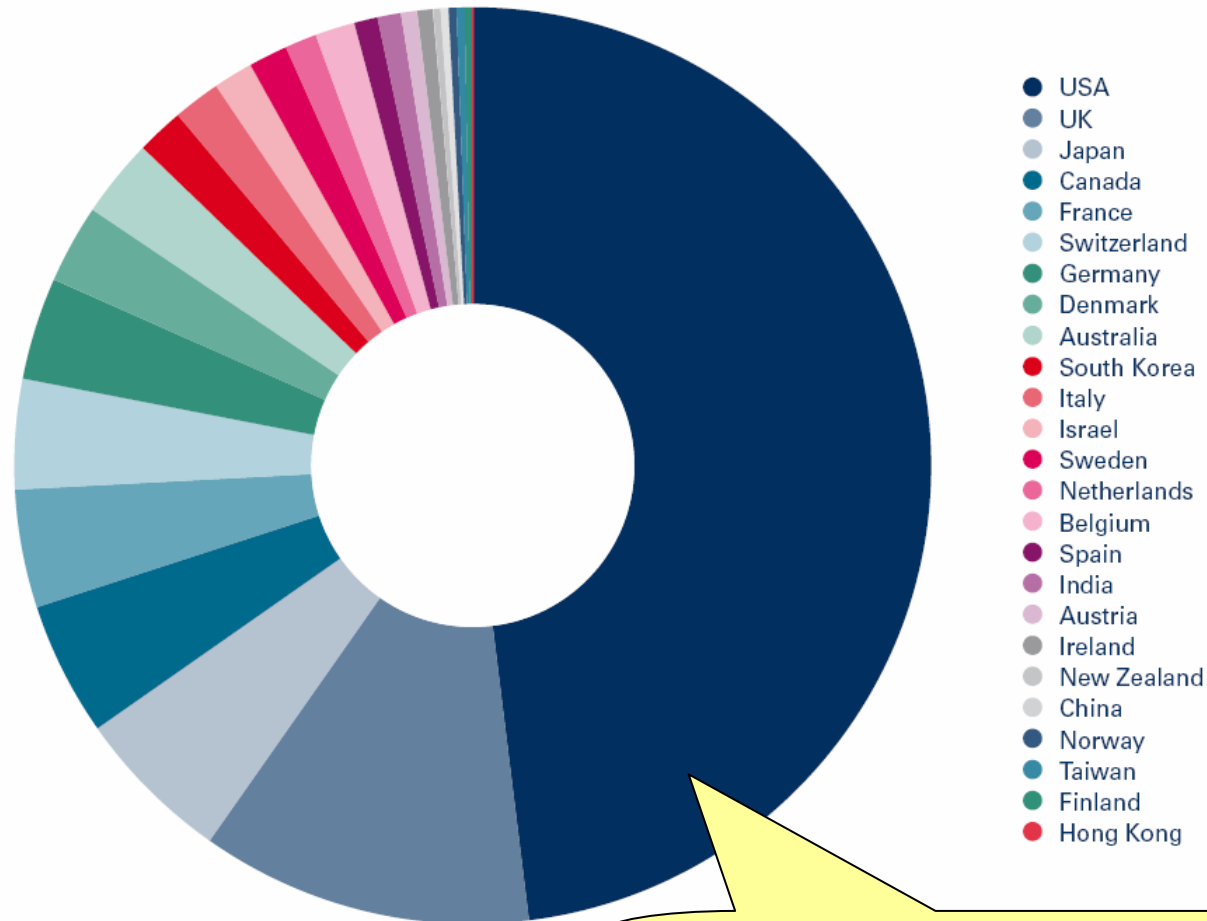
Source: Cambridge Healthcare & Biotech

The UK's biotech supercluster



UK pipeline- Number 2 in the world

- Output from the US biotech and pharmaceutical companies dwarves all others, but the UK has the number two R&D pipeline in the world – more than twice as big as that of Japan, the third largest.

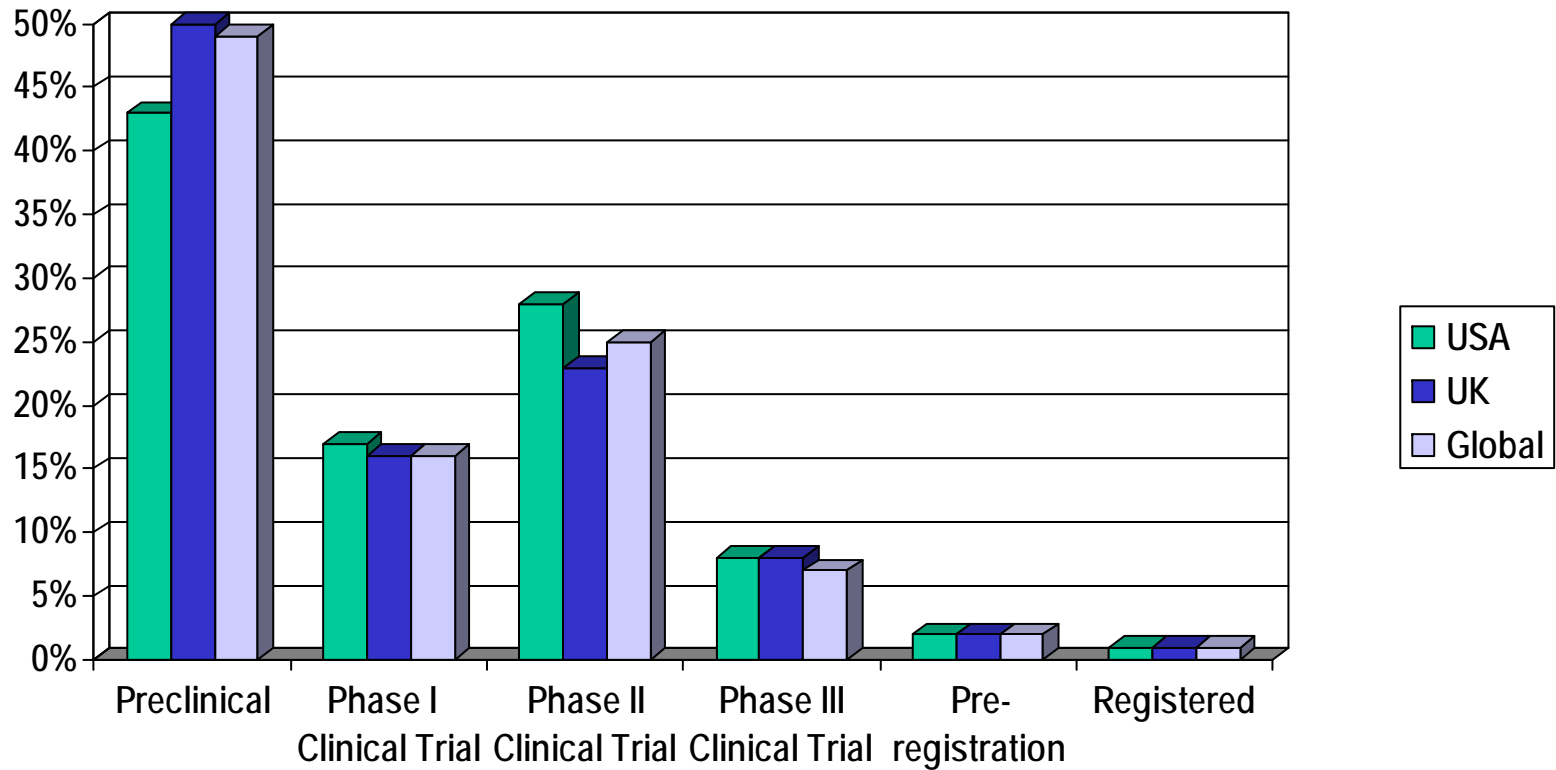


includes discovery projects from US-owned research facilities outside the US

Source: PharmaProjects & Cambridge Healthcare & Biotech



UK company split by development stage is more or less the same as with US companies (or the rest of the world for that matter)

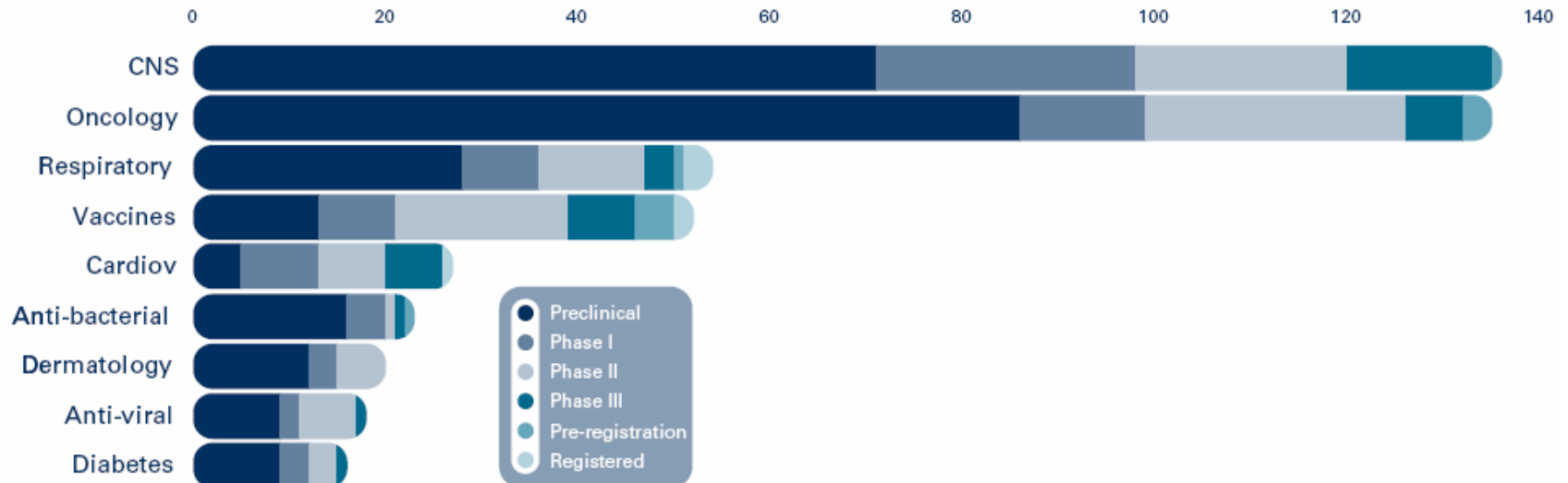


Source: PharmaProjects & Cambridge Healthcare & Biotech



UK Pipeline- key therapy areas

- The UK has Europe's leading pipelines in several key therapy areas, including particular strengths in the CNS, Oncology and Respiratory areas.



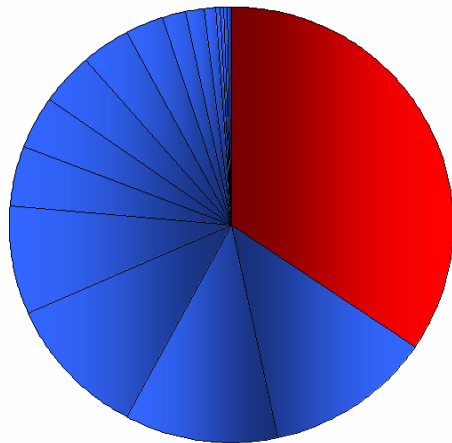
Source: Cambridge Healthcare & Biotech



Key Therapy Areas

The UK clearly has the largest overall pipeline in Europe, with almost three times the number of products in development as France, the European number two. However, there are certain key therapy areas where the UK has an even stronger position. The UK has the strongest pipeline in 26 of the 34 therapy areas currently under development in Europe.

35% of the total European pipeline was discovered by UK companies



■ Total products UK
■ Total products Rest of Europe

These key therapy areas include:

- CNS (psychiatry & neurology)
- Oncology (cancer)
- Respiratory
- Vaccines
- Cardiovascular
- Anti-bacterial



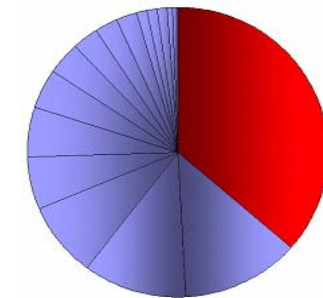
Key Therapy Areas - CNS

- There are currently 136 CNS products in active development in 34 companies in the UK

Amarin is a neuroscience company dedicated to improving the lives of patients suffering from diseases of the central nervous system. Amarin currently has 6 CNS products in development:

- Miraxion for Parkinson's
- Miraxion for Huntington's
- Miraxion for depression
- LAX-201 for depression
- AMR-101 for Parkinson's
- MCT-125 for MS fatigue

More than a third of the European CNS pipeline is developed in UK companies



■ CNS products UK
■ CNS products Rest of Europe

Other key UK CNS companies include Oxford Biomedica, Vernalis and Xytis.

CeNeS pharmaceuticals discovers and develops treatments for disorders related to the central nervous system particularly in the areas of pain, anaesthesia and neurology.

CeNeS currently has four CNS products in development:

- M6G for post-operative pain
- CNS 5161 for neuropathic pain
- CNS 7056 short acting sedative
- COMT inhibitor for Parkinson's



Key Therapy Areas - Oncology

- There are currently 135 oncology products in active development in 30 companies in the UK

Antisoma is a biopharmaceutical company specialising in the development of products in the treatment of cancer. Antisoma currently has 8 oncology products in active development:

- AS1404 for lung cancer
- AS1402 for breast cancer
- AS1404 for prostate cancer
- AS1409 for renal cancer
- AS1404 for ovarian cancer
- AS1406
- AS1411 for renal cancer
- Telomere targeting agents

41% of the European oncology pipeline was discovered by UK companies



Other key UK oncology companies include Cancer Research Technology, Cyclacel and Onyvax

Astex Therapeutics discovers and develops molecularly-targeted drugs for cancer and other human diseases with significant unmet need.

Astex currently has 7 oncology products in active development:

- AT7519 cell cycle inhibitor
- PKB/Akt inhibitor
- AT9283 mitosis inhibitor
- FGFr inhibitor
- AT9311 cell cycle inhibitor
- JAK-2 inhibitor
- AT13387 Hsp90 inhibitor



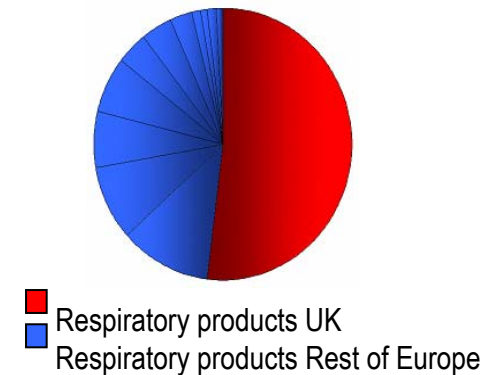
Key Therapy Areas - Respiratory

- There are currently 54 respiratory products in active development in 12 companies in the UK

Vectura is an emerging pharmaceutical company that is developing a range of inhaled drugs for the treatment of lung diseases and conditions where delivery via the lungs can provide significant benefits. Vectura currently has 5 respiratory products in active development:

- NVA237 for COPD
- QVA149 for COPD
- VR315 for asthma
- VR496 for cystic fibrosis/COPD
- VR694 for asthma

Over half of the European Respiratory pipeline was discovered by UK comps.



Other key UK respiratory companies include Arachnova, Argenta Discovery, Evolutec and Oxagen.

Synairgen is a drug discovery company specialising in respiratory diseases with a focus on COPD and asthma. Synairgen currently has 4 respiratory products in active development:

- Interferon β I for asthma
- Interferon β II for COPD
- Growth factor for asthma
- IL-4 and IL-13 Blocking Peptide for asthma



Key Therapy Areas - Vaccines

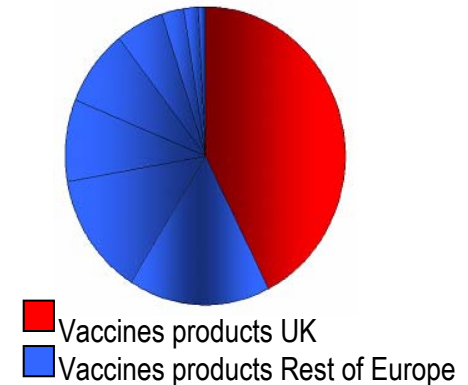
- There are currently 52 vaccine products in active development in 7 companies in the UK

Acambis is a leading biotechnology company targeting infectious diseases with novel vaccines.

Acambis currently has 7 vaccine products in active development:

- ACAM2000 smallpox vaccine
- ChimeriVax JE vaccine
- ChimeriVax West Nile vaccine
- ChimerVax Dengue vaccine
- Clostridium difficile vaccine
- Influenza vaccine
- Herpes vaccine

42 % of the European vaccine pipeline was discovered by UK companies



Other key UK vaccine companies include Allergy therapeutics, Oxxon Therapeutics (now part of Oxford Biomedica) and Lipoxen.

Genvax, a subsidiary of Medical Marketing International Group (MMI), is developing DNA vaccine products based on the work of Professor Freda Stevenson and colleagues.

Genvax currently has 7 vaccine products in active development:

- Lymphoma vaccine (idiotypic)
- Myeloma vaccine (idiotypic)
- CMV vaccine
- Prostate cancer vaccine
- Broad spectrum cancer vaccine
- Influenza vaccine
- Tuberculosis vaccine



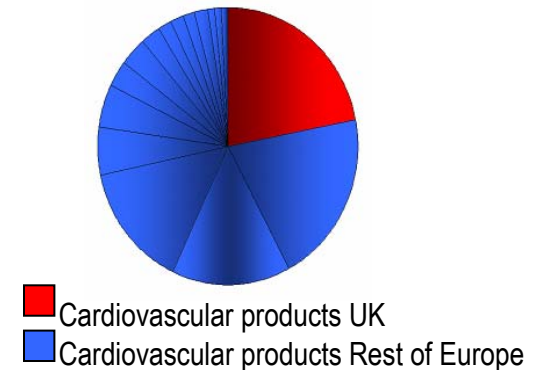
Key Therapy Areas - Cardiovascular

- There are currently 27 cardiovascular products in active development in 10 companies in the UK

Trigen is a biopharmaceutical company discovering and developing cardiovascular drugs with a focus on thrombosis and atherosclerosis. Trigen currently has 2 cardiovascular products in active development:

- TGN 255 for thrombosis
- PR-15 for atherosclerosis

22% of the European cardiovascular pipeline was discovered by UK comps.



Other key UK cardiovascular companies include Ardana, Vernalis and Xention.

Ark Therapeutics as a gene medicine company developing a broad range of products based on vascular and endothelial molecular biology to treat vascular and circulatory diseases. Ark therapeutics currently has one product and two devices in active development for cardiovascular diseases:

- Trinam for restenosis
- EG010 diagnostic kit
- EG001 delivery device



Key Therapy Areas - Anti-bacterial

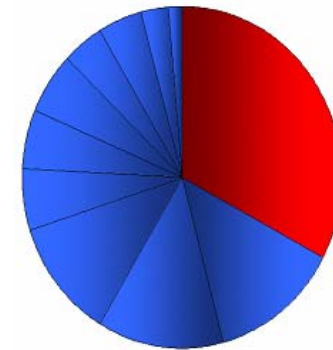
- There are currently 23 anti-bacterial products in active development in 23 companies in the UK

Prolysis is an antibacterial drug discovery and development company focused on the treatment of hospital-acquired and community-associated infections.

Prolysis currently has 3 antibacterial products in active development:

- CDI 538 cell division inhibitor
- MUR 807 cell wall synthesis inhibitor
- CDI 936 staphylococcal infections
- GYR 767 DNA supercoiling inhibitor

A third of the European anti-bacterial pipeline was discovered by UK comps.



- Anti-bacterial products UK
- Anti-bacterial products Rest of Europe

Other key UK anti-bacterial companies include Amura, Destiny Pharma and Haptogen.

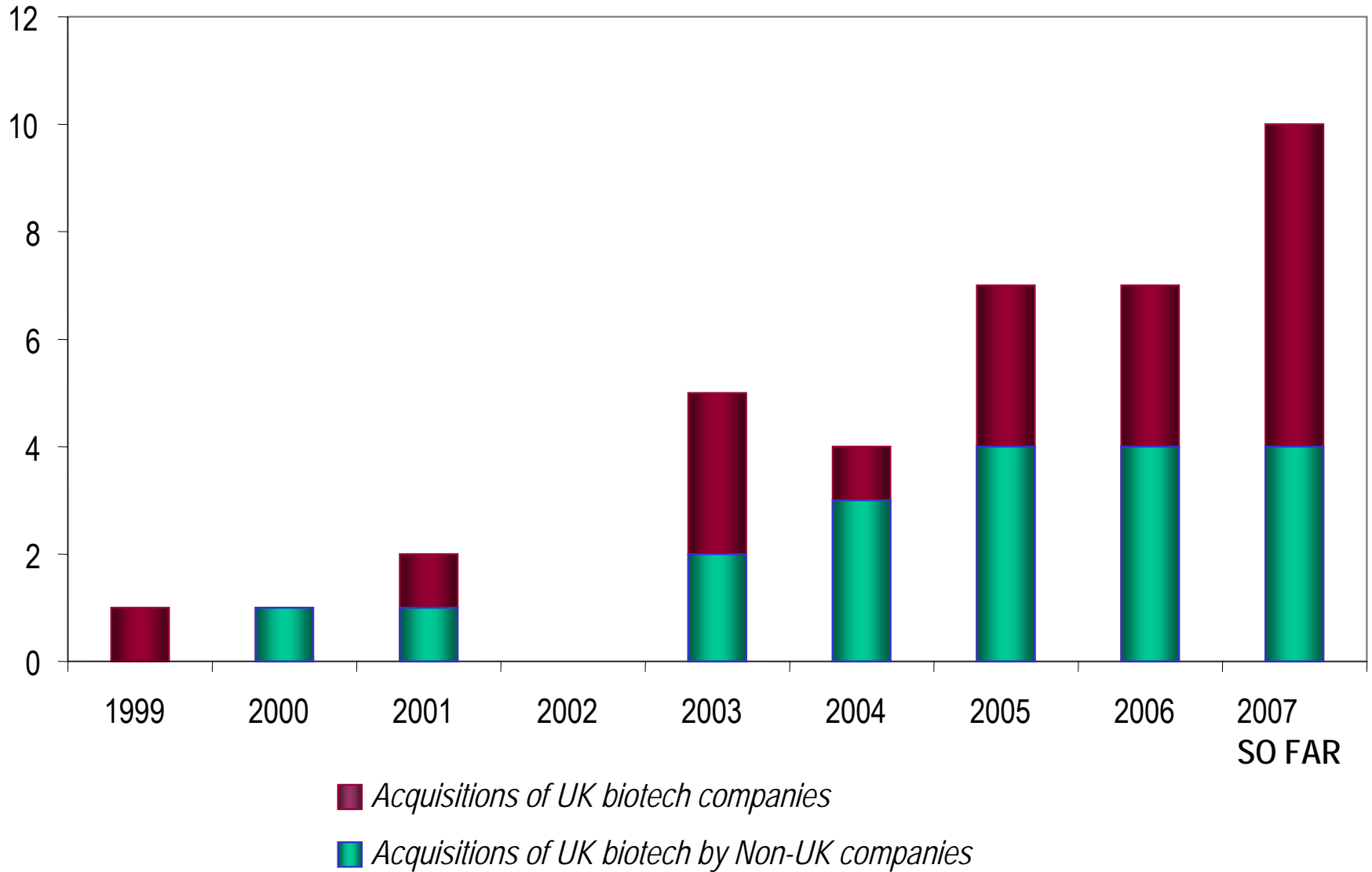
Phynova develops pharmaceutical drugs in the fields of anti-microbials, anti-virals, anti-inflammatories and oncology.

Phynova currently has 2 anti-bacterial products in active development:

- PYN6 for MRSA
- PYN5 for respiratory tract infection



The strength of UK based research has also led to an acceleration of acquisitions of UK biotech companies





Contact details



*Martyn Postle, Director
Cambridge Healthcare & Biotech Ltd
The Mansion House
Chesterford Research Park
Little Chesterford
CB10 1XL, UK*

martyn.postle@chandb.com

tel +44 (0)1799 530 009

fax +44 (0)870 751 7505

www.chandb.com

Additional slides





Academic Ranking of World Universities

Ranking Criteria and Weights

Criteria	Indicator	Weight
Quality of Education	Alumni of an institution winning Nobel Prizes and Fields Medals	10%
Quality of Faculty	Staff of an institution winning Nobel Prizes and Fields Medals	20%
	Highly cited researchers in 21 broad subject categories	20%
Research Output	Articles published in Nature and Science*	20%
	Articles in Science Citation Index-expanded, Social Science Citation Index	20%
Size of Institution	Academic performance with respect to the size of an institution	10%
	Total	100%



<i>ACQUIRED</i>	<i>ACQUIRER</i>	<i>ACQUIRER NATIONALITY</i>	<i>AMOUNT</i>	<i>DATE</i>	<i>UK FACILITY KEPT?</i>
Cerebrus Pharmaceuticals	Vanguard Medica	UK	£7m	03/12/1999	-
Biovation	Merck	USA	-	26/10/2000	no
Cambridge Drug Discovery	BioFocus	UK	£27.5m	01/06/2001	yes
Gemini genomics	Sequenom	USA	\$229m	20/09/2001	no
RiboTargets	British Biotech	UK	\$40m	21/03/2003	-
Powderject	Chiron	USA	\$878m	09/07/2003	-
Oxford Glycosciences	Celltech	UK	£102m	18/07/2003	-
Molecular Light Technology	Gen-Probe	USA	\$11m	08/08/2003	yes
KS Biomedix	Xenova	UK	£8.48m	01/09/2003	yes
Oxoid	Fisher Scientific	UK	\$330m	01/03/2004	yes
Amersham	General Electric	USA	\$9.5bn	08/04/2004	yes
Celltech	UCB	Belgium	£1.53bn	01/07/2004	yes
Meridica	Pfizer	USA	\$125m	12/11/2004	yes
Amedis Pharmaceuticals	Paradigm	UK	-	10/01/2005	yes
Tudor Health Care	Pharmaceutical Development Services	UK	-	01/02/2005	yes
Cambridge Biotechnology	Biovitrum	Sweden	-	25/04/2005	yes
Microscience	Emergent BioSolutions	USA	-	27/06/2005	yes
Arakis	Sosei	Japan	£106.5m	19/07/2005	yes
Ionix	Vernalis	UK	£12.5m	26/07/2005	partly
Biofocus	Galapagos	Belgium	£20.2m	01/10/2005	yes
CAT	AZ	UK	£702m	16/05/2006	yes
NeuTec	Novartis	Switzerland	£305m	07/06/2006	yes
Delta Biotechnology	Novozymes	Denmark	-	06/07/2006	yes
Avidex	MediGene	Germany	€50m	30/10/2006	yes
Inpharmatica	Galapagos	Belgium	€12.5m	06/12/2006	yes
Domantis	GSK	UK	\$453m	08/12/2006	yes
Kudos	AZ	UK	\$230m	24/12/2006	yes
CTM Biotech	Alpha Biologics	UK	-	05/01/2007	partly
Innovata	Vectura	UK	\$243m	18/01/2007	yes
Solexa	Illumina	USA	\$600m	26/01/2007	yes
Molecular SkinCare Ltd	York Pharma	UK	£5.54m	02/02/2007	yes
GeneMedix	Reliance Life Sciences	India	£14.5m	07/02/2007	yes
Arrow therapeutics	AZ	UK	\$150m	02/03/2007	yes
Oxxon therapeutics	Oxford Biomedica	UK	£16m	12/03/2007	yes
DanioLabs	VASTox	UK	£15m	22/03/2007	yes
Paradigm therapeutics	Takeda	Japan	-	29/03/2007	yes
Genevac	Riverlake partners	USA	-	03/04/2007	yes



World total pipeline by country

	Preclinical	Phase I Clinical Trial	Phase II Clinical Trial	Phase III Clinical Trial	Pre-registration	Registered	Total
USA	1117	445	715	220	60	35	2592
UK	321	102	145	50	15	7	640
Japan	128	72	108	33	19	6	366
Canada	190	41	66	19	8	7	331
France	161	38	59	25	3	7	293
Germany	148	30	62	17	3	4	264
Switzerland	92	56	50	27	11	5	241
Denmark	98	27	45	11	1	1	183
Australia	113	21	32	4	1	1	172
South Korea	88	19	14	6	4	1	132
Italy	54	10	24	5	2	4	99
Netherlands	50	19	19	5	2	1	96
Israel	54	6	28	2	1		91
Belgium	42	7	23	8	5		85
Sweden	50	13	14	4	2		83
Spain	34	9	12	4	1		60
India	29	8	15	1			53
Austria	32	4	4	1	1	1	43
Ireland	14	2	11				27
China	18	3	3			2	26
New Zealand	19	3	1	1			24
Norway	14		6	1		1	22
Taiwan	12		4	2			18
Singapore	15						15
Finland	2	1	4		1		8
Argentina	6			1			7
Hong Kong	5		2				7
Portugal	5		1	1			7
Bermuda		1	3	1			5
Iceland	2	1	2				5
Russian Federation			2		2		4
South Africa	2	1			1		4
Barbados					2	1	3
Hungary	1		2				3
Thailand	1			1			2
Bosnia and Herzegovina			1				1
Cuba						1	1
Greece	1						1
Latvia	1						1
Philippines		1					1
Total	2919	940	1477	450	145	85	6016