Translational Medicine

Collaboration in the Industry: Taking a Closer Look at Wyeth's Translational Medicine Research Collaboration

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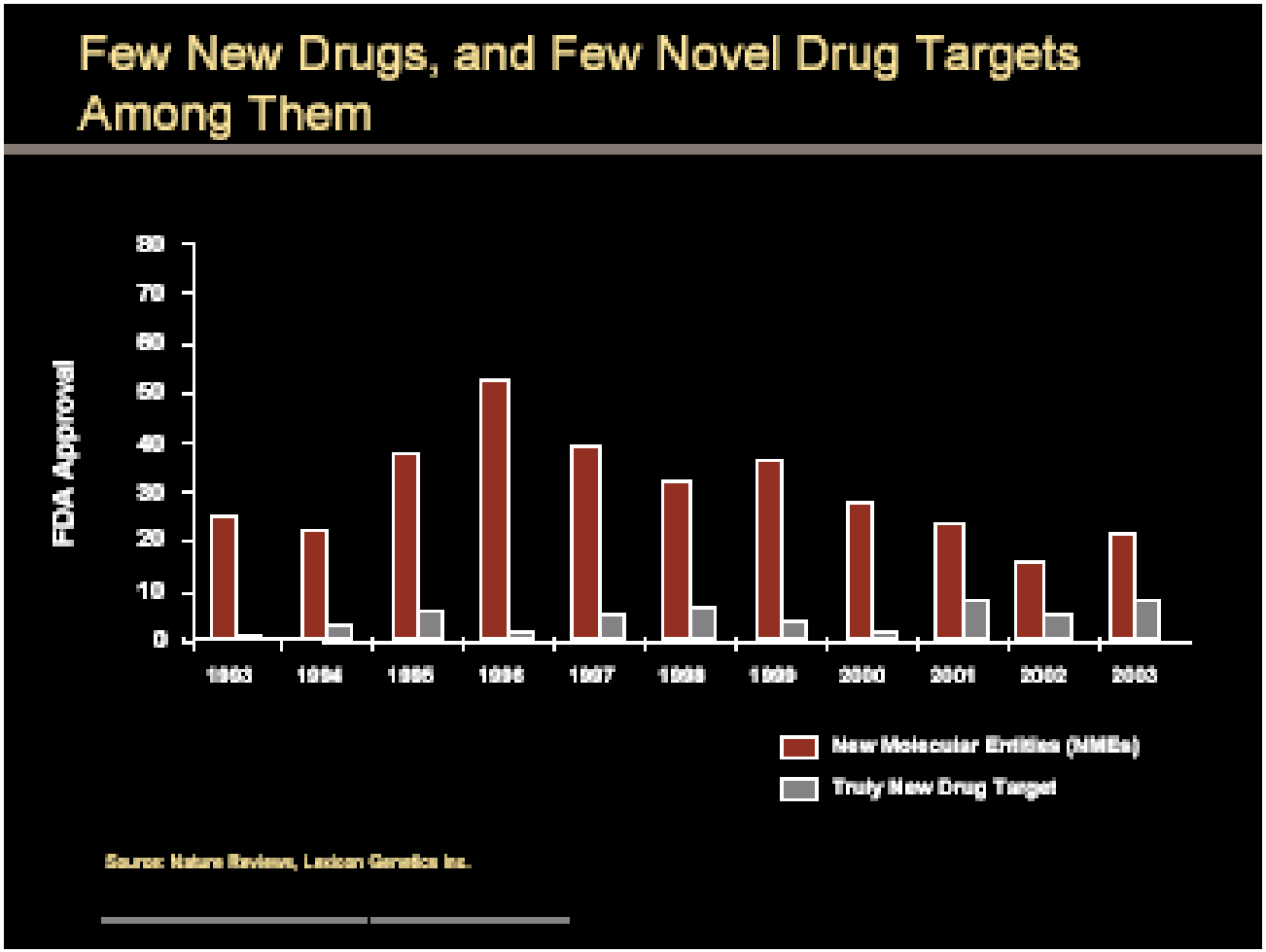
Ass Vice President
Head, Discovery Translational medicine

Wyeth Research

Where Have all the New Drugs Gone?



Both the proportion & absolute number of compounds that prove safe & effective in humans is declining

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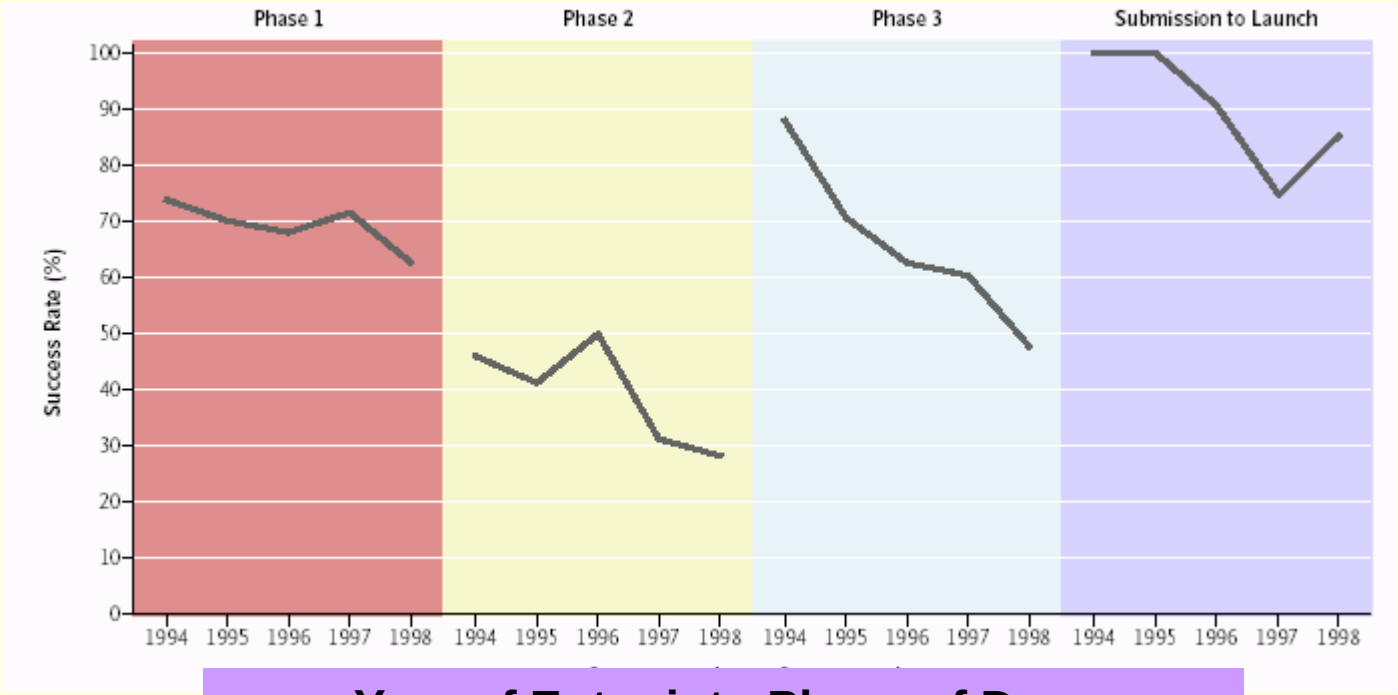
How are we doing in Drug Development?

Success Rates in All Phases of Drug Development.



Ref: Mervis J. Productivity counts — but the definition is key. **Science 2005;309:726.**

Reproduced from JJWood, NEJM 355::6,618,2006

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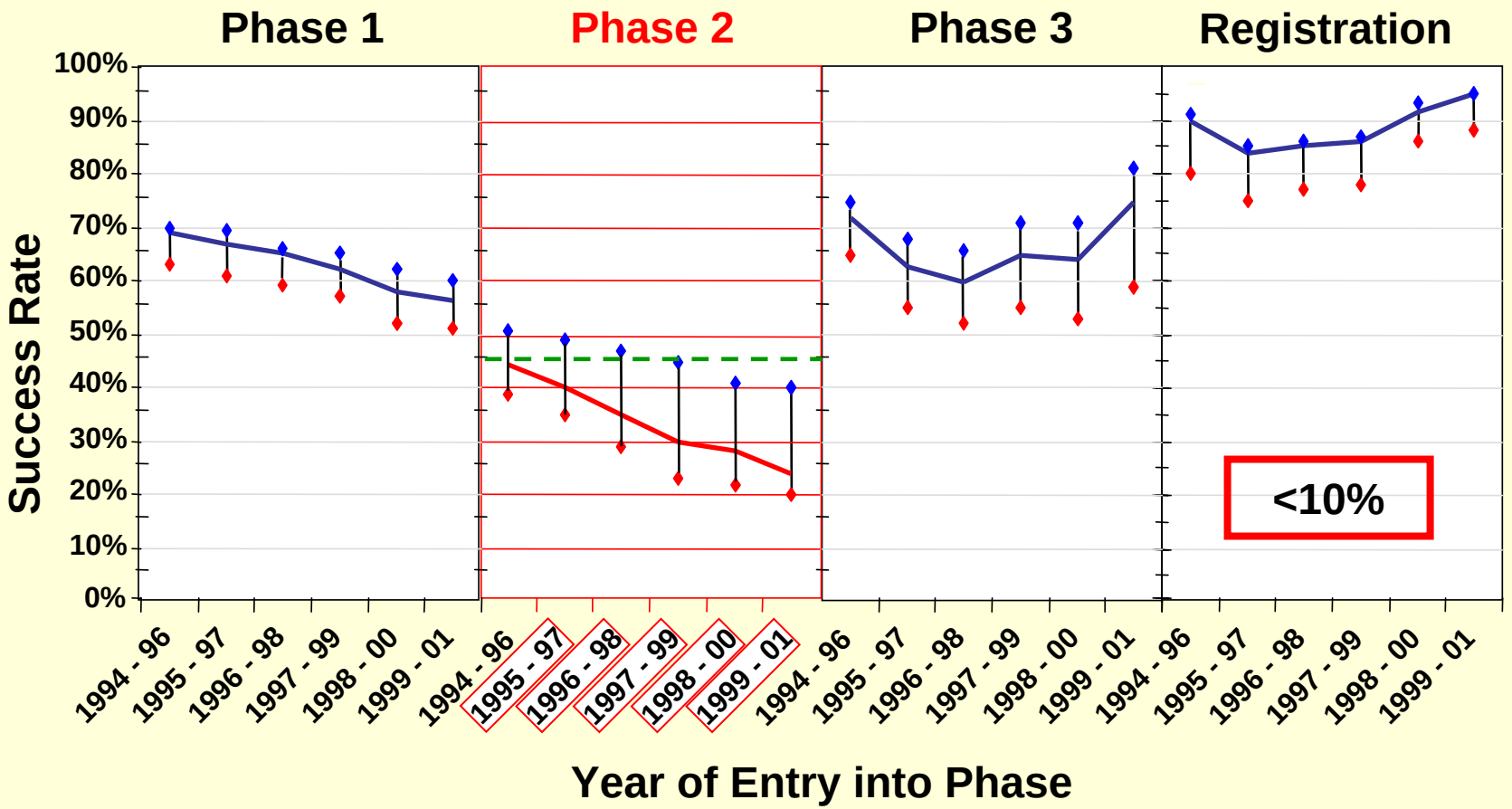
Phase 2 attrition rates are increasing across the industry



Source: 2005 Global R&D Performance Metrics Programme: Industry Success Rates Report, CMR International, May 2005, p. 7

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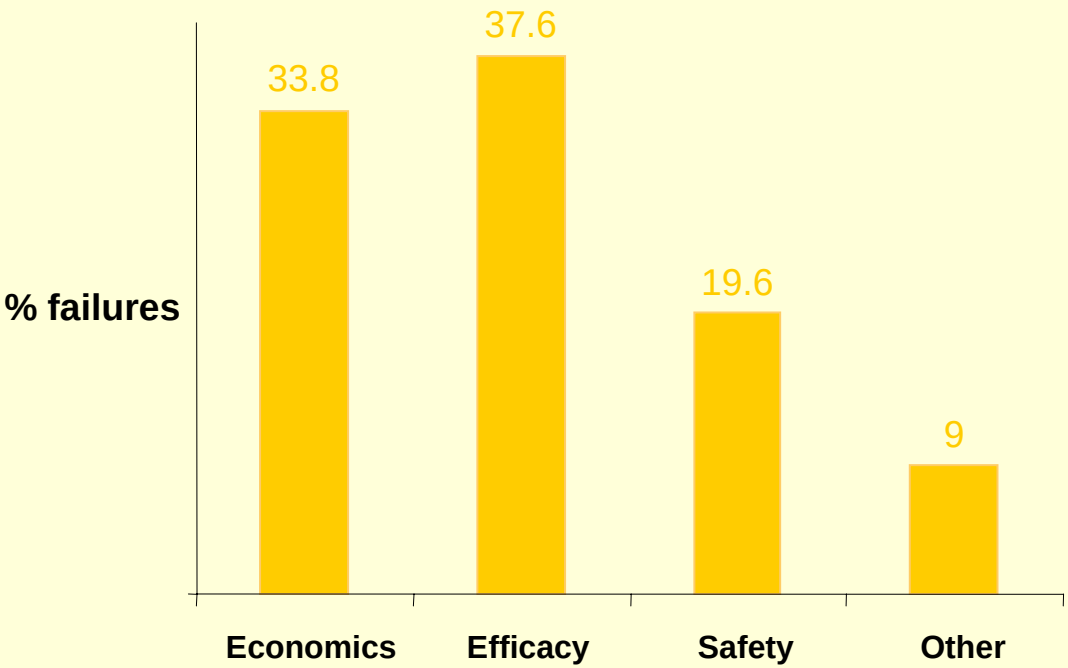
Lack of efficacy and safety issues are the major causes of Phase 2 attrition



Both the proportion & absolute number of compounds that prove safe & effective in humans is declining, despite an increasing number that are safe and effective in animal models

Adapted from: DiMasi, Clin Pharmacol Ther, 2001;69(5):297-307

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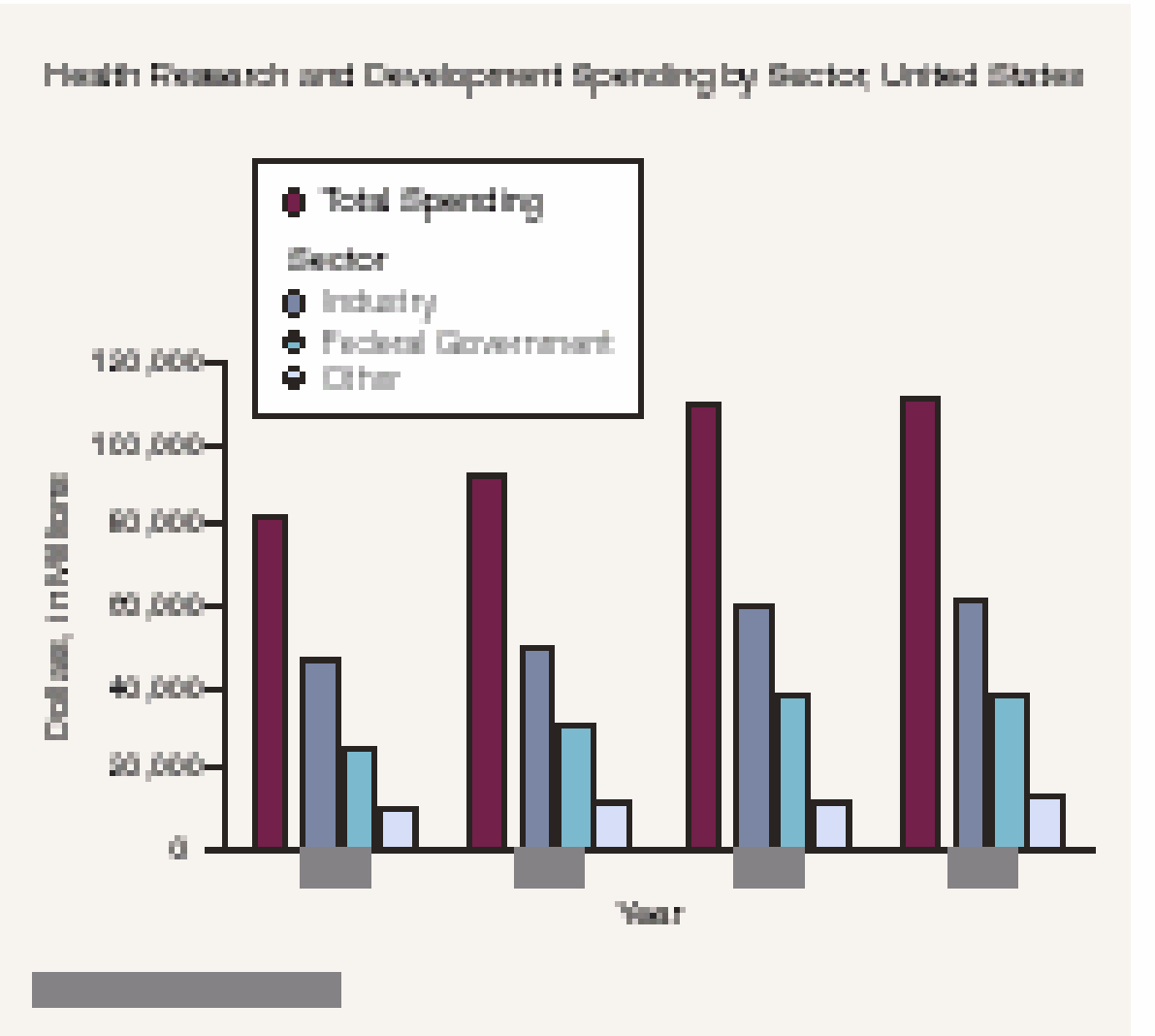
Industry- Leader in health R&D



JAMA, September 13, 2006—Vol 296, No. 10, 1219

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Translational Medicine

Translational Research in the Pharmaceutical Industry aims at using Biological Tools for clinical applications.

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Translational Medicine Mission

Biomarkers

- Discovery, Validation, implementation
- PK/PD
- Efficacy and MOA
- Adverse effects and MOA
- Patients selection (responders, non-responders, progressors, etc)

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Biomarkers: Key strategy to achieve Translational Medicine Goals

A **"Biomarker"** is a quantifiable biological variable that **characterizes** cellular, organ, physiological,

Pathological or clinical condition

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Biomarkers: Key strategy to achieve Translational Medicine Goals

A "Disease Biomarker" is a biomarker that maintains significant correlation with a physiological, Pathological or clinical condition

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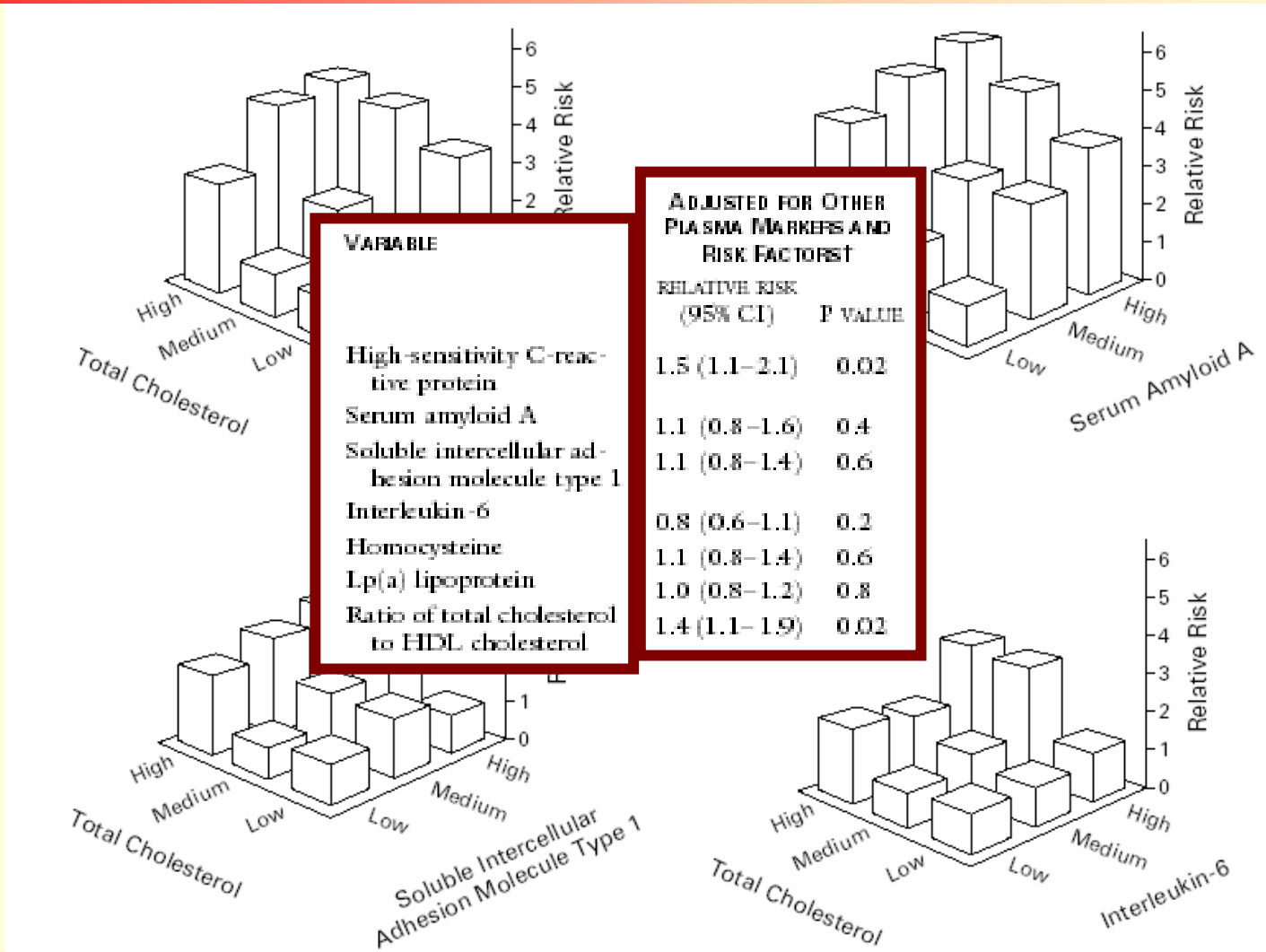
Be Ware of Biomarkers Correlations



Variable	Adjusted for Other Plasma Markers and Risk Factors† Relative Risk (95% CI)	P Value
High-sensitivity C-reactive protein	1.5 (1.1–2.1)	0.02
Serum amyloid A	1.1 (0.8–1.6)	0.4
Soluble intercellular adhesion molecule type 1	1.1 (0.8–1.4)	0.6
Interleukin-6	0.8 (0.6–1.1)	0.2
Homocysteine	1.1 (0.8–1.4)	0.6
Lp(a) lipoprotein	1.0 (0.8–1.2)	0.8
Ratio of total cholesterol to HDL cholesterol	1.4 (1.1–1.9)	0.02

CRP AND OTHER MARKERS OF INFLAMMATION IN THE PREDICTION OF CARDIOVASCULAR DISEASE IN WOMEN

. P RIDKER, H. HENNEKENS, J E BURING, N RIFAI. NEJM 2000; 342, 836

Biomarkers: Key strategy to achieve Translational Medicine Goals

"Target-Compound Interaction" Biomarker:

a biomarker

that denotes direct interaction of

compound with its designated target.

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Biomarkers: Key strategy to achieve Translational Medicine Goals

A "Pharmacodynamic Biomarker"

is a

biomarker that characterizes

the pharmacological consequence(s) of

drug interaction with a biological target

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Biomarkers: Key strategy to achieve Translational Medicine Goals

Surrogate Biomarker: The Most Desired Biomarker

Biomarker that substitute for (predicts)

clinically meaningful endpoints

(clinical endpoints directly measure how patients function, feel or survive)

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Biomarkers: Key strategy to achieve Translational Medicine Goals

"Biomarker for Patients selection" is a

biomarker that characterizes certain patients that are likely to respond or resist treatment

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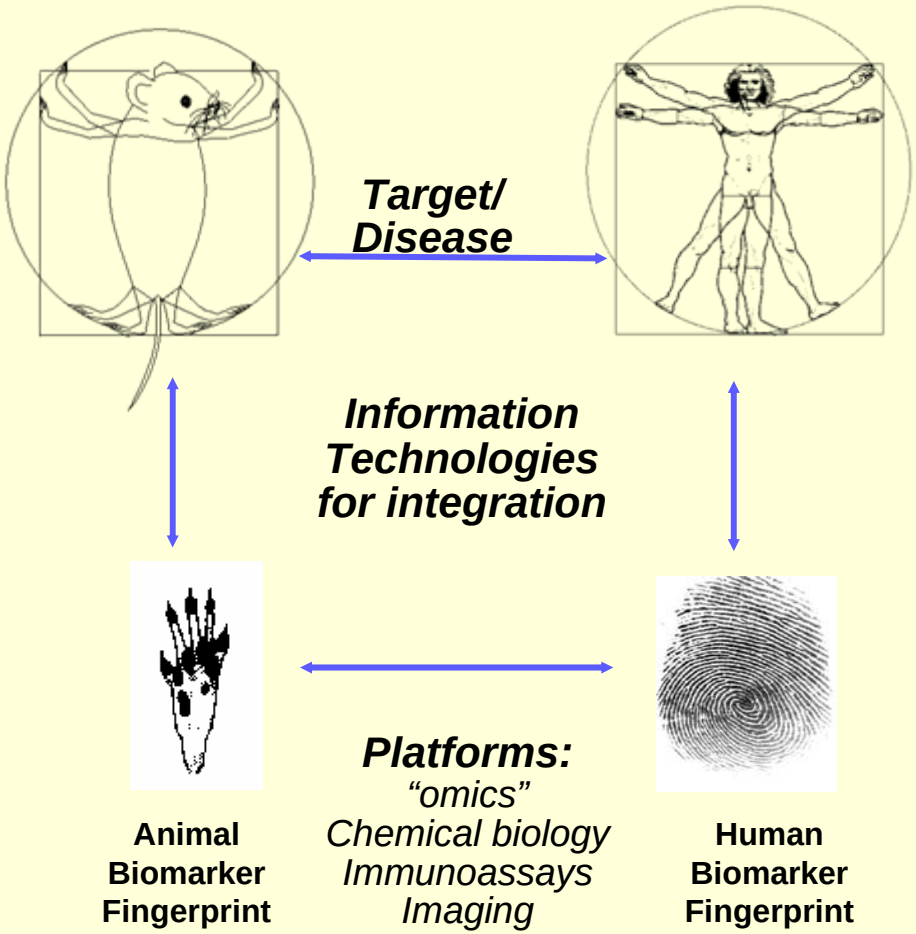
So how can the most promising drug candidates be identified earlier in development?



***Animal models do not accurately predict the effects of drugs in man*!**

Translational Medicine

✓Discover and develop biomarkers to objectively measure drug effects in man

✓ Better predict clinical safety and efficacy of drug candidates

✓Better understanding of animal model relative to human disease

Wyeth Research

Academic/industrial collaborations are important for the success of TMed

NATURE REVIEWS | DRUG DISCOVERY VOLUME 4 | NOVEMBER 2005 | 891

Finding improved medicines: the role of academic–industrial collaboration

Jaye Chin-Dusting, Jacques Mizrahi, Garry Jennings and Desmond Fitzgerald

No single pharmaceutical company or university has access to more than 1% of global R&D talent

NATURE REVIEWS | DRUG DISCOVERY VOLUME 4 | OCTOBER 2005

Anticipating change in drug development: the emerging era of translational medicine and therapeutics

Garret A. FitzGerald

N Engl J Med 353;15 October 13, 2005

Translational and Clinical Science — Time for a New Vision

Elias A. Zerhouni, M.D.

Wyeth Research

At Wyeth we favor collaborations where goals, risk and reward are shared

A common current model…

✓ No strings attached funding
✓ High risk, “blue skies” projects
✓ Endowments

And increasingly…

✓ Pay to “access” university network
✓ Unrealistic IP positions

The new model…

✓ Focus on disease mechanisms
✓ Shared goals and objectives
✓ Complimentary skill base
✓ Jointly funded by academia and industry
✓ Shared risks and rewards
✓ True “collaboration”

Wyeth Research

Each party brings a particular set of strengths to the partnership

Wyeth Research

- New therapeutics
- Product development
- Clinical trials
- Technology applications
- Focus and drive

IP & know-how

+

University of Dundee · University of Aberdeen · University of Glasgow · University of Edinburgh

- World-class research
- University networks
- New technology
- Tissue banks
- Educational programs

IP & know-how

+

NHS Scotland

- Stable population
- Single health provider
- Unique patient identifier
- Patient registries
- Data networks

IP & know-how

Umbrella agreement for shared and protected IP

Success from the partnership is anticipated in many forms

Research…

- ✓ Identification of novel biomarkers
- ✓ New animal and human experimental models
- ✓ A better understanding of human biology and disease
- ✓ Generation of peer–reviewed publications
- ✓ Increased funding opportunities

Commercial…

- ✓ Shared collection of ideas & IP
- ✓ Economic growth in the life sciences industry
- ✓ New diagnostic tools
- ✓ Increased number of novel therapies

Healthcare…

- ✓ Earlier diagnosis of disease
- ✓ Better medicines for patients

Wyeth Research

The TMRC is a 5 year renewable commitment by Scottish Enterprise & Wyeth

Scottish Enterprise Commitment

Operational: $35 million

over 5 yrs

Wyeth Commitment

Operational : $8.5 million

Research contracts: ~$45 million over 5 yrs

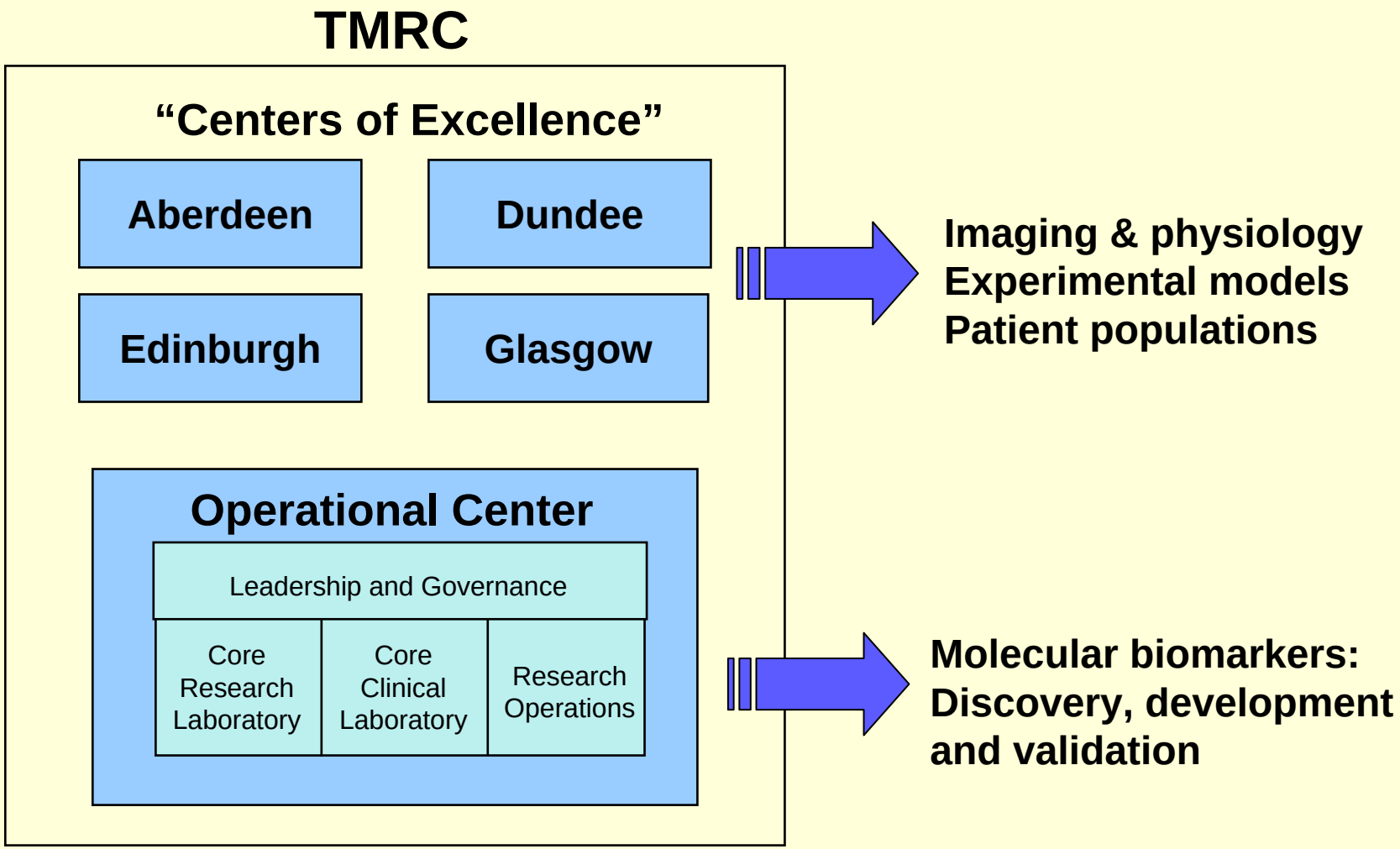
TMRC

A dedicated research institute devoted to translation science and biomarker development

- ✓ **Hub for translational community**
- ✓ **Educational and scientific leadership**
- ✓ **High quality preclinical and clinical research**
- ✓ **New biomarkers and experimental models**
- ✓ **New diagnostic tools for patient care**

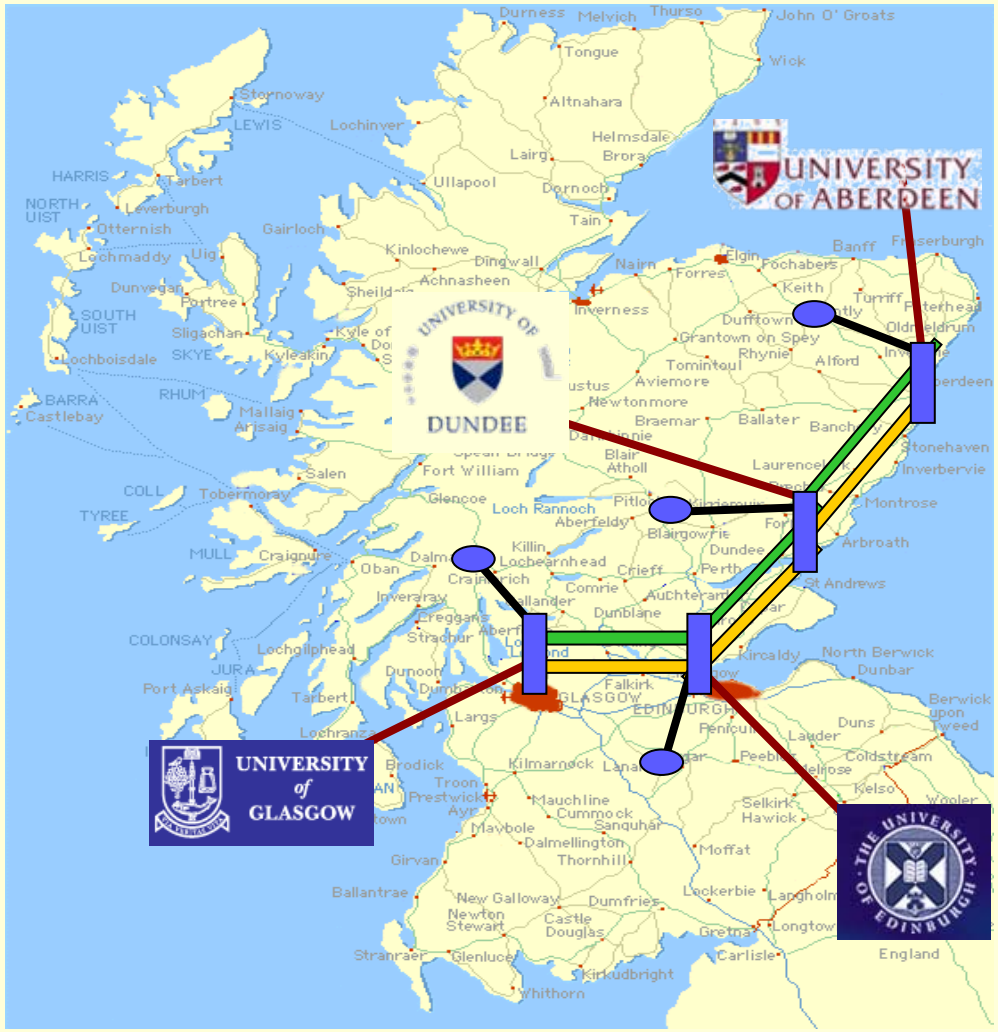
Wyeth Research

Research apportioned to the Universities and the Core Laboratory based unique strengths



Wyeth Research

Wyeth has formed a unique partnership between 4 universities and the Scottish government



Why Scotland?

- World-class basic & clinical research
- World-class technology
- Patient base
- Data networks
- Umbrella agreement
- Government support

NHS SCOTLAND

Scottish Enterprise

Wyeth Research

TMRC in the media

PHARMACOLOGY

US group signs £50m deal to create medical research network

By Andrew Jack and Andrew Bolger

Wyeth, the US pharmaceutical group, yesterday signed a £50m deal with Scottish Enterprise and four leading academic institutions to create a pioneering medical research network.

The universities of Dundee, Edinburgh, Aberdeen and Glasgow and National Health Service Scotland will link in a "translational medicine" collaboration with Wyeth designed to identify new ways to treat patients with heart disease, cancer, depression and osteoporosis.

The research will focus on the identification of "biomarkers". Biomarkers are natural molecules that indicate whether someone has a disease. They are used in drug testing as they are easier to measure than the disease and can show whether a medicine works on humans.

Wyeth, based in Philadelphia, will invest about £33m over five years, with an option to extend for a further five years. Scottish Enterprise, the government-funded development agency, will invest up to £17.5m, which it hopes to recover through a series of spin-off diagnostics companies.

"This project is very, very exciting," said Frank Walsh, executive vice-president for worldwide discovery research at Wyeth. "It offers shared risk and shared reward. Each party will get a return."

Wyeth will use some of its money to enhance an existing Dundee University laboratory that will become the site of a corporate "hub" for proprietary research. Initially a dozen of Wyeth's staff will be seconded there.

The company will also help support a series of research projects and is analysing 70 submitted by academics with the aim of selecting the first dozen or more to launch in the weeks ahead.

The deal follows a search for potential partners by Wyeth across the US and Europe. Mr Walsh said the company chose Scotland because of its strong medical research tradition, the ability to work with four universities with up to 500 academics and the scope to work with a high proportion of Scotland's 5m patients, most of whose medical details are entered in electronic databases.

Jack Perry, chief executive of Scottish Enterprise, said: "Ideally we would like to see Scotland recognised as the world centre for translational medicine – the place where pharmaceutical companies feel they have to be."

Professor Andrew Morris of Dundee University, an expert in diabetes, said one factor attracting Wyeth had been Generation Scotland, a programme that seeks to recruit up to 30,000 Scottish volunteers to study the way genetics and lifestyle factors affect disease. He said: "There has been a fantastic spirit of co-operation between the academic institutions and the NHS. Scotland is too small to be considered as anything other than one research site."

THE TIMES

Home news

Pounds 50m boost for medical research in Scotland

4 April 2006
The Times
Scotland edition

A Pounds 50 MILLION scheme that could see Scotland lead the world in the development of new medicines was announced yesterday.

The American pharmaceutical company Wyeth is investing Pounds 33 million in the project, which could lead to advances in technology and new drugs becoming available faster.

In addition, Scottish Enterprise will contribute up to Pounds 17.5 million over five years.

NATIONAL NEWS

Drugs group to fund research network.

By ANDREW BOLGER and ANDREW JACK

4 April 2006

FT FINANCIAL TIMES

Wyeth, the US drugs group, yesterday signed a Pounds 50m deal with Scottish Enterprise and four leading academic institutions to create a pioneering medical research network.

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The research will focus on the identification of "biomarkers".

The Herald

£50m US medicine link-up to create 120 jobs

McConnell launches project

£50m boost for medical research in Scotland

By a Scotland Correspondent

A £50 MILLION scheme that could see Scotland lead the world in the development of new medicines was announced yesterday.

The American pharmaceutical company Wyeth is investing £33 million in the project, which could lead to advances in technology and new drugs becoming available faster.

In addition, Scottish Enterprise will contribute up to £17.5 million over five years.

Details of the unique partnership were announced jointly in New York by Jack McConnell, the First Minister, and in Glasgow by Andy Kerr, the Health Minister.

It could see treatments developed which could help heart and cancer patients, as well as those suffering from bone conditions and diabetes.

Wyeth, which has its headquarters in Philadelphia, will work with four of Scotland's leading universities — Aberdeen, Glasgow, Dundee and Edinburgh — as well as NHS Grampian, Greater Glasgow, Lothian and Tayside.

Initially 50 jobs will be created at a state-of-the-art laboratory in Dundee, but that could rise to 120 in five years.

The money from Scottish Enterprise will be used to establish a company called TMRI, which will link Wyeth with the universities and the health boards involved.

Mr McConnell described the deal as being an international first. After meeting Wyeth representatives in New York, he added: "It is great for Scotland and the Scottish economy and will bring health benefits not just for Scots but patients all over the world. This further strengthens our position as a natural home for excellence and innovation and will do a huge amount to raise the global profile of the pioneering work being done in our universities.

"This new partnership will also save lives across the world by speeding up the development of new medicines and getting them from the laboratory to the patient quicker."

Mr Kerr said the project would help to bring theoretical, laboratory-based science work closer to practical applications which would benefit NHS patients. He added: "It is a great example of the public and private sectors working together for mutual benefit."

TUESDAY 4 APRIL 2006 THE SCOTSMAN

FOUNDED: 25 JANUARY 1817

THE SCOTSMAN

The Conductors pledge themselves for impartiality, firmness and independence... their first desire is to be honest, the second is to be useful... the great requisites for the task are only good sense, courage and industry

FROM THE PROSPECTUS OF THE SCOTSMAN, 30 NOVEMBER 1816

The right project for Scotland

field of 'designer' medicine

£50m research to create revolutionary 'personalised drugs'

LYNDSAY MOSS AND ALASTAIR JAMIESON

SCOTLAND is to lead the world in the development of "personalised drugs" which are expected to revolutionise treatment for cancer, heart disease, diabetes and mental illness.

In a unique £50 million collaboration between universities, NHS boards and pharmaceutical giant Wyeth, the medical records of thousands of Scottish patients will be used to design

Jack McConnell hailed the collaboration as an international first

Picture: Stephen Mansfield

medicine is key to the successful development of the next generation of innovative medicines which will truly make a difference for patients the world over."

Professor John Savill, head of the College of Medicine and Veterinary Medicine at the Edinburgh University, said they now hoped to speed up new treatments from lab to the bedside.

"This is part of the journey towards personalised medicine," he said. "It is an aspiration we are working towards."

Professor Savill said they hoped there would be "a wealth gain as well as health gain" for the NHS in terms of a return on the investment.

Professor Stephen Logan, senior vice-principal at Aberdeen