



**THE UNIVERSITY**  
*of* **TEXAS**

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**MEDICAL SCHOOL**  
**AT HOUSTON**

*A part of The University of Texas*  
*Health Science Center at Houston*

# **Preparation of a** **Basic Science Research Proposal**

**(based on North America standards)**

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# Part-1 Dissection of Basic Sciences Research

- **Where** the studies are performed?
- **Who** performs the studies, who pays for the studies?
- **How they review** the research proposals (the review processes)?
- **What kind of research proposal** wins the grants (review criteria)?
- **How they monitor** the funded projects?
- **Which direction** are they heading, what are the system outcomes?
- **What are the differences?**



## Where the studies are performed-1

### **Public sector**

States Universities , Institutes and Foundations

NIH, NSF, CDC, NASA, MD Anderson cancer center

### **Private sector**

Universities and Institutes

The Baylor College of Medicine

The Scripps Research Institute

Texas Heart Institute

Pharmaceutical companies



- **Where the studies are performed-2**

**Principal investigators have their own research laboratories.**

**Animal facilities are the essential Part of any research institutes.**

**Core laboratories play important role.**





- **Where the studies are performed-2**

**The basic science departments are the major players.**

**Groups of investigators (Cardiovascular research center, HIV/AIDS research center) no physical places.**

**Indirect costs/overhead for electricity, rent, cleaning, building maintenance, administration support (a significant portion of universities budget, no free loaders)**

**Regulations, protocol for human studies (IRB), animal studies, biosafety, radioactive .....**



## • Who performs the studies-1

### Principal Investigators (PIs)

Assistant professor or research scientist

A large number are trained physicians (MD)

Education 10-20% /research 80-90%  
(college for education/University for Research)

In the universities they make their own salary  
(Start up package)

Grant submission

Publications and presentations in  
scientific conferences (Travel a lot)





## • Who performs the studies-2

Postdoctoral research fellow

Research associate/lab manager

Research assistant/research technician

Ph.D or graduate student

Volunteer, Administrator, Collaborator

**Authorship** (major/minor)

First author

Corresponding author





## Who pays for the studies-1

The amount of money they spent on health-related research in 2007 was **\$122 billion.**

**Industries : 66** Billion , Pharmaceutical companies, **35** Billion

**Government: 38** billion, NIH , **30** billion

Others: **17** Billion, donations, **2** billion

Our country annual budget is around **250 Billion dollars**, 0.5% for research and half for medical research it will come to **0.6 Billion**





## Who pays for the studies-2

### The main providers;

**Pharmaceutical and biotechnology companies (Pfizer, AstraZeneca, Roche, Merck).**

**Governmental organization (NIH, NSF, DOD, VA, CDC)**

**Non Governmental Organizations (NGO)**

**American Heart Association (AHA)**

**American Diabetes Association (ADA)**

**private foundations (*Howard Hughes Medical Institute*)**



## Who pays for the studies-4



### **National Institutes of Health (NIH)**

**The National Institutes of Health (NIH) is an agency of the Department of Health and Human services and is the primary agency of the United States government responsible for biomedical and health-related research.**

**Its science and engineering counterpart is the National Science Foundation(NSF).**

**The NIH is divided into two parts: "Extramural" and "Intramural"**



## Who pays for the studies-3



**The NIH, comprising 27 separate institutes, centers and the office of director.**

**National Cancer Research, National Heart, Lung and Blood Institute, National institute of General Medical Science, National Library of Medicine (Pubmed), Center for Scientific Review.**

**National Institutes of Health invests over \$30 billion each year in 325,000 researchers at over 3,000 universities, medical schools, and other research institutions.**



## Who pays for the studies-3



**For NIH :**

**Apply for twice or three times a year**

**Centralized peer review**

**chance <5% for NIH**

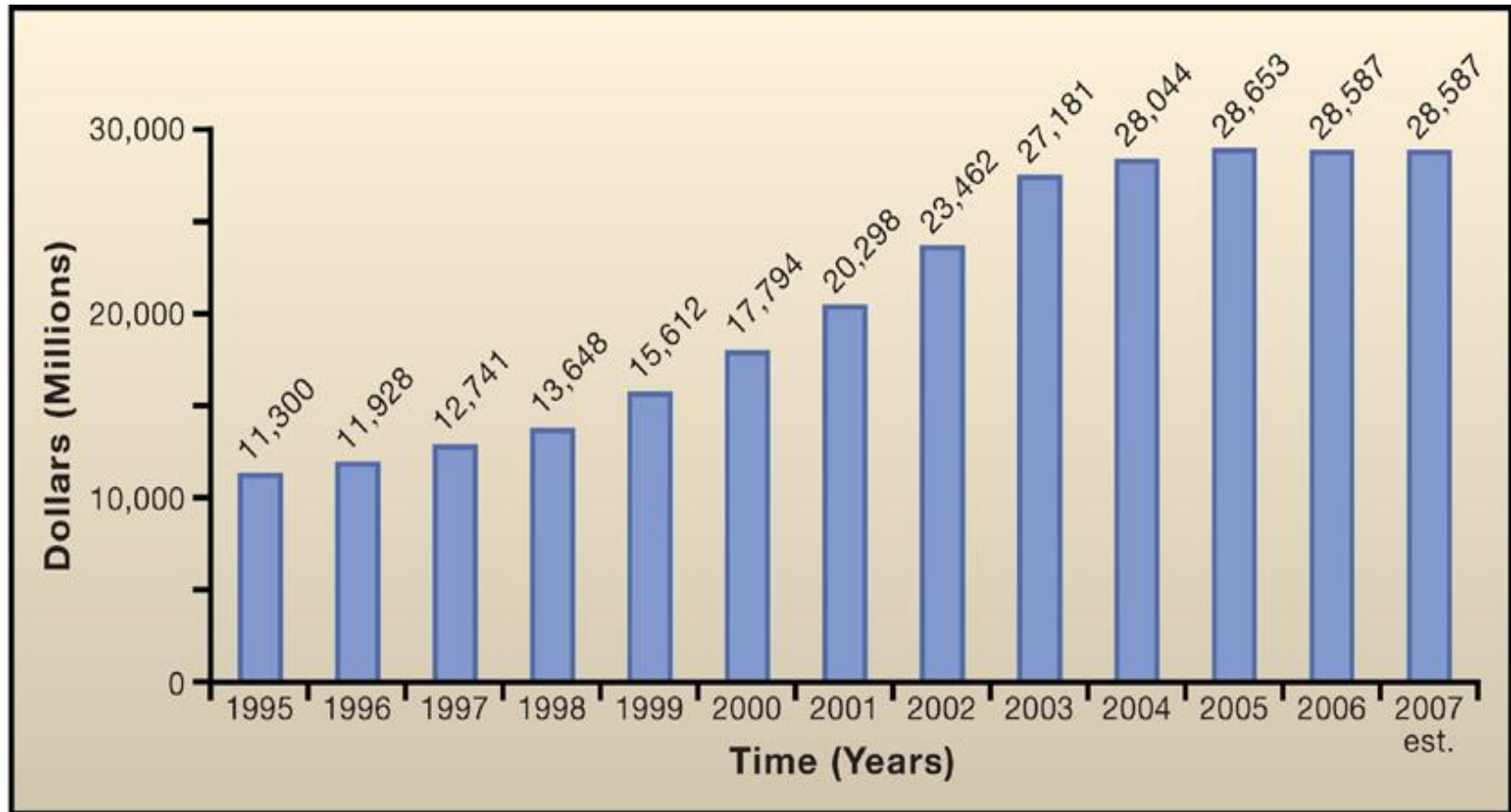
**Renewable every 4-5 years**

**K series, P series, R21, R01, R3?**

**The annual budget for a lab is between  
300,000-500,000 USD.**



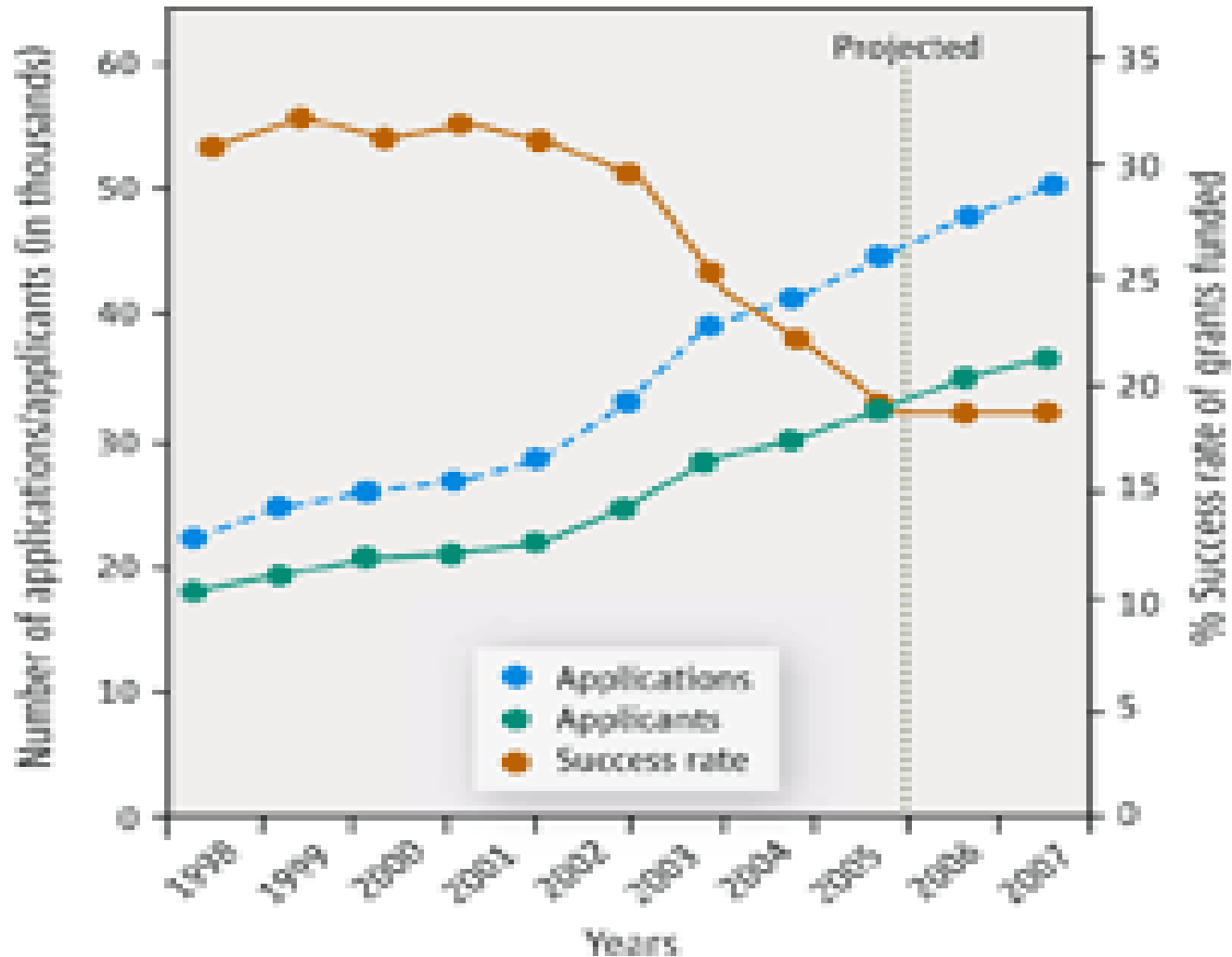
# NIH Budget for Fiscal Years 1995 to 2007



Source: FASEB Office of Public Affairs (<http://opa.faseb.org/pdf/NIHFundingTrends.pps>).



# NIH Budget for Fiscal Years 1995 to 2007





- **How they review the research proposals (the review processes)-1**



**NIH in America and CIHR in Canada are the main sources of funding for the majority of researchers.**

**Grant application and reviewing is mostly centralized.**

**The 25 pages proposal for a major NIH grant is prepared by investigators and is submitted by the university.**



- **How they review the research proposals (the review processes)-1**

**Preparation of a NIH major grant (R01) takes 6-8 months.**

**Investigators decide to send the proposal to one of the NIH institutes for review**

**Over 40,000 reviewers to serve on 2500 NIH expert committees per year.**





# Center for Scientific Review (SCR)

Review activities of the Center for Scientific Review (CSR) are organized into **Integrated Review Groups (IRGs)**. Each IRG represents a cluster of **study sections** around a general scientific area.

## **Integrated Review Group (IRG)**

**AIDS and Related Research**

**Cell Biology**

**Cardiovascular and Respiratory Science**

## **Study Sections for Cardiovascular**

**Atherosclerosis and inflammation of the  
cardiovascular system study section**

**Vascular cell and molecular biology study section**

**Cardiovascular differentiation and development  
study section**



## • How they review the research proposals (the review processes)-2

In the study sections the proposals are reviewed by scientists, Two to three times a year

The reviewers receive the proposal by email

**Triage system**, 50% will not be reviewed  
2-3 major reviewer, 10-12 members of each committee vote

The review process takes 6-9 months

The applicants have access to the reviewer names.

The reviewers are getting paid and are changed every 4 years





## • How they review the research proposals (the review processes)-3

Priority scores reflect the relative strengths and weaknesses of an application, with the lowest scores indicating the highest level of merit:

**100-150: Outstanding**

**151-200: Excellent**

**210-250: Very Good**

**251-350: Good**

**351-500: Acceptable**

**Ranking (percentile)**

**An application's rank relative to other applications reviewed by the same SRG.**

**The applicant receives a Summary Statement as the result**



- **How they review the research proposals (the review processes)-6**

**The second level of review is performed by Institute and Center National Advisory Councils or Boards.**

**Only applications that are favorably recommended by both the reviewers and the Advisory Council may be recommended for funding.**

**Resubmission for twice, A1, A2 ( landing in the airport).**

**Pharmaceutical companies 2-3 pages of a panel of 10-12 with one or two scientific consultants proposals (easy money)**



- What kind of research proposal win the grants (review criteria)-1

**Significance : Does this study address an important problem?  
If the aims of the application are achieved, how will this  
advance scientific knowledge?**

**Innovation: Does the project employ novel concepts, approaches  
or methods? Are the aims original and innovative?**



- **What kind of research proposal win the grants (review criteria)-2**

**Approach: Are the conceptual framework, design, methods, and analyses adequately developed, well integrated, and appropriate to the aims of the project?**

**Observational/Mechanistic research**

**Investigators: Are the PI(s) and other key personnel appropriately trained and well suited to carry out this work?**

**Environment: Do(es) the scientific environment(s) in which the work will be conducted contribute to the probability of success?**



## • How they monitor the funded projects

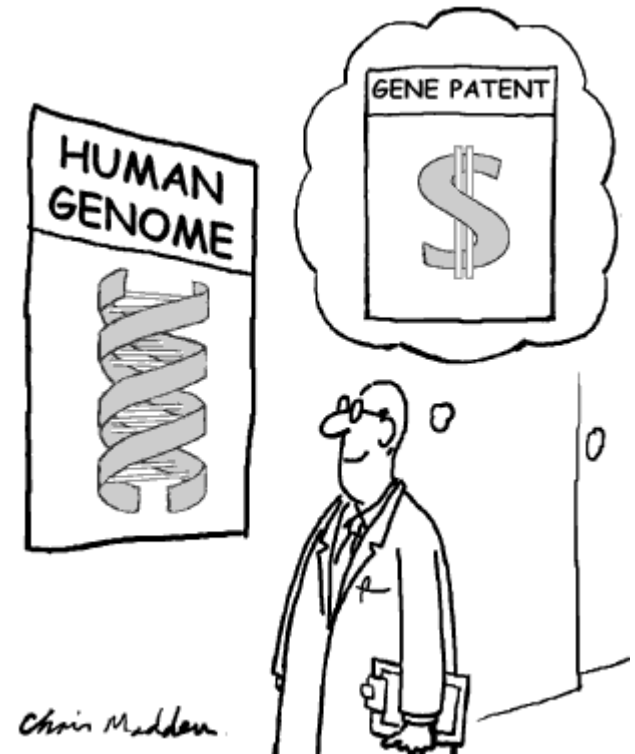
Annual reports (to approve the next payment)

No micromanagement

Publications, publish or perish

**Patents** (200,000 per year)

Presentations





- Which direction are they heading

NIH Research Priorities for 2002-2012 (Road map):

**Basic Sciences :New Pathways to Discovery**

**Translational research: Research team of future**

**Clinical Research: Re-engineering the Clinical Research Enterprise**

**Pharmaceutical companies are after new drugs**





# • What are the system outcomes

## Short term

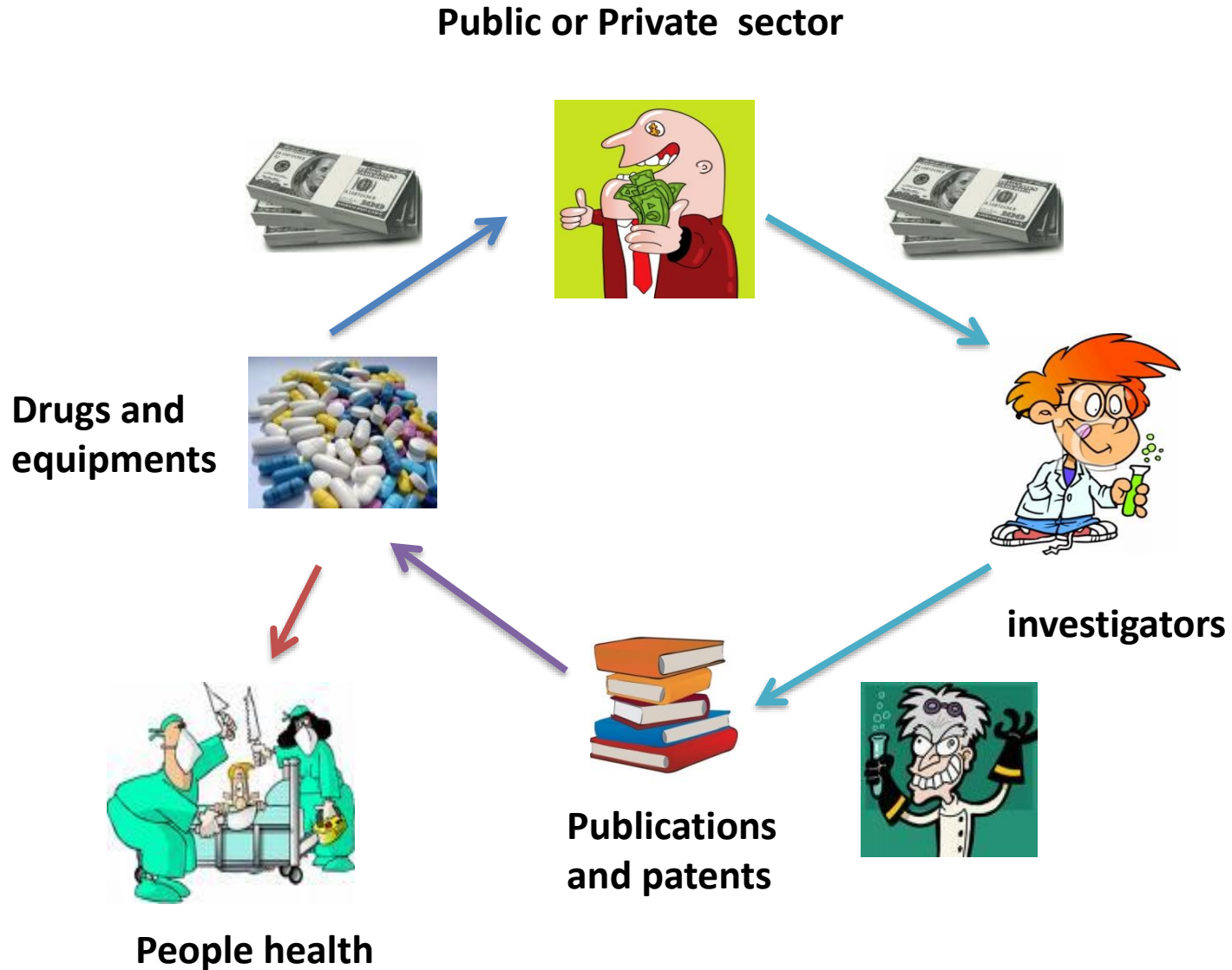
- 1-Publication in high impact journals**
- 2-Patents (University and investigator 50/50)**
- 3-Training of new scientists**
- 4-Knowledge (pure basic science projects, harder to fund)**

## Long term

- 1-Wealth (Pharmaceutical company are the richest)**
- 2-Improvement of people health (cholesterol)**



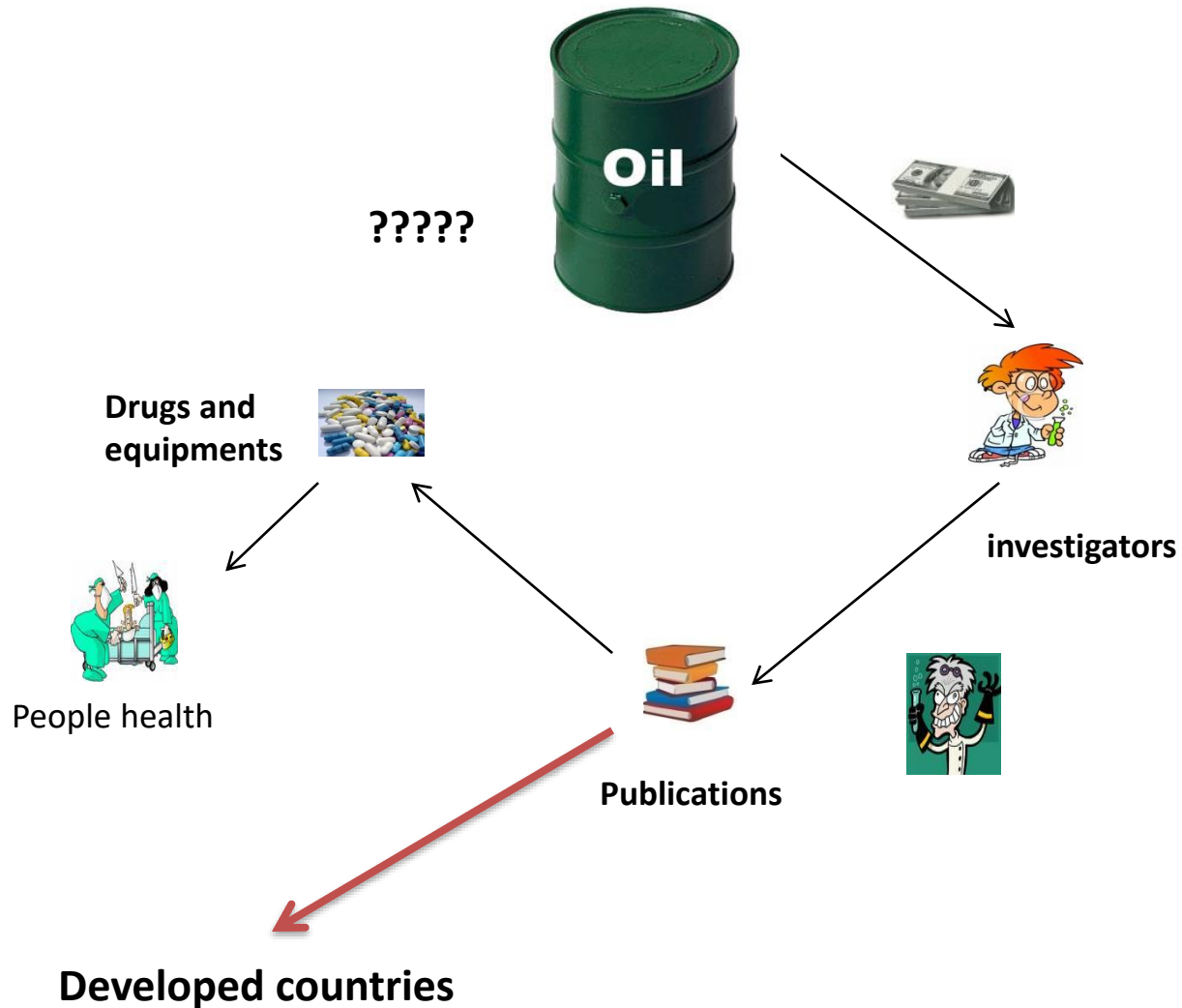
# Research cycle in North America





# Research cycle in our country

## Government





## What are the main differences-1

**1-Dramatically less investment (Basic science research is expensive)**

**2-We do not have enough professional research scientists and enough tools(K.O animals) for basic science research**

**3-We mostly perform observational/clinical research and not mechanistic**



## What are the main differences-2

**4-Our proposal review system in basic science is not centralized so we cannot prioritize our resources**

**5-Outcomes of our research do not serve our health system**

**6-No link between private sector and researchers in our system**

**7-Collaboration between our groups is minimum**

**8-Number of publications is important but not as much as the quality**