



Globalization, Justice & Health Conference

**Human Development &
Pharmaceutical Development
with Special Reference to
TRIPS & India**

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**Director General,
Council of Scientific & Industrial Research**

3-4 November 2003

Human Development Challenges

- ✧ **Reducing poverty**
- ✧ **Access to food**
- ✧ **Access to education**
- ✧ **Combating disease**

Opposing Views

For

Strong IPR stimulates economic growth

**Increases agricultural & Industrial
production**

Higher domestic & foreign investments

Facilitate Technology transfer

Opposing Views

Against

IP Rights do little to stimulate invention in developing countries

Limits the option of technological learning through imitation

Foreign firms drive out domestic competition

Increased cost of medicines & agricultural inputs



**The move to globalise the protection of
intellectual property is not politically
sustainable without at the same time,
making the delivery of
health technology more
equitable**

Global health Forum

Feb 2000

**“Governments to
ensure the
accessibility of
pharmaceuticals
as well as their
affordability to all”**

UN Commission on Human
Rights April 2001

IPR Commission - Some Final Thoughts

Some Final Thoughts

For too long IPRs have been regarded as food for the rich countries and poison for poor countries. It is not as simple as that. Rich countries can get indigestion from overindulgence. And poor countries may find them a useful dietary supplement provided they are accommodated to suit local palates and not force-fed. The appropriate diet for each developing country needs to be decided on the basis of what is best for its development. It is this guiding principle that should help the national governments and international community to arrive at rational decisions, which can help integrating intellectual property rights into a balanced development policy



Recent Landmark Events 2000-2003

- **HIV/AIDS case in South Africa**
- **Compulsory licensing of HIV/AIDS drugs in Brazil**
- **Anthrax Scare**
- **International Commission on Intellectual Property Rights Commission Report**
- **Doha and post Doha events**

IPR Commission Conclusions

- **IP System is one factor among several others that affects access to medicines by the poor**
- **Lack of resources, absence of suitable health infrastructure, other policies contribute adversely**

IPR Commission Recommendations

- **Increase public funding to stimulate research on health problems of the poor**
- **Ensure that IP protection regime not counter to public health policies**
- **Establish differential pricing mechanism but stop leakage of low priced drugs**
- **Use compulsory licensing with workable laws and procedures**

IPR Commission Recommendations

- **Adopt strict standards of patentability**
- **Exclude diagnostic, therapeutic & surgical methods from patentability**
- **No ‘new use’ patents**
- **Use “Bolar Exception” to facilitate entry of generic competitors**

INDIA-TRIPS OBLIGATIONS MET

WORLD TRADE
ORGANIZATION

- ⇒ To install transitional facility, i.e., ‘mail-box’ for product patent applications and grant of exclusive marketing rights (EMRs), from 1.1. 1995
- ⇒ 1999-First Amendment-The Patents (Amendment) Act, 1999 - made effective from 1.1. 1995
- ⇒ To comply with obligations relating to rights of patentee, term of patent, compulsory licensing, reversal of burden of proof, from 1.1. 2000
- ⇒ 2002-Second amendment- The Patents (Amendment) Act, 2002 - made effective from 20.5. 2003

INDIAN PATENT ACT (2003) COMPULSORY LICENSING

Public interest protection

- ❖ Availability of product at reasonable price through compulsory license of patents(Chapter 16)
- ❖ Emergent situations (Section 92)
- ❖ Parallel import (Section 107A(b))
- ❖ Use of invention for the purpose of Government and acquisition of invention by the Government in public interest (Chapter 17)

PUBLIC INTEREST PROTECTION

- * **Import of medicines by Government (Section 47)**
- * **Acquisition of patent right by Government (Section 102)**
- * **Conditional grant of patent (Section 47)**
- * **Bolar provision (Section 107A(a))**
- * **Research and Experimentation Exemptions (Section 47)**
- * **Revocation of Patent in public interest (Section 66)**

India - Some Health Indicators

	1960	2000
Life Expectancy	41.2 Yrs	62.9 Yrs
Infant Mortality (Per Thousand)	146	69
Death Rate (Per Thousand)	22.8	8.9
Total Number of Doctors	65000	500000

Indian Paradoxes

- **Richest 20% enjoy 3 times the share of public subsidy compared to the poorest quintile**
- **Poorest 20% have double the mortality rates, fertility rates and under nutrition levels than the richest 20%**
- **Poorest spend 12% of their incomes on healthcare as opposed to 2% by rich**
- **One episode of hospitalization wipes out all the assets of a poor family**

Indian Pharmaceutical Industry

50s	Formulation	Mostly imported MNC Dominance
60s	Formulation	Domestic endeavour on imported
70s	Formulation Bulk Drugs	Little Import Indigenous manufacture
80s	Formulation Bulk Drugs	Marginal imports Mostly indigenous manufacture based on domestic R&D
90s	Formulation Bulk Drugs	Insignificant imports
2000 plus	Drugs & Pharma	Strong Generics New Molecule Research

Indian Drugs and Pharma Industry (2003)

TYPE	No. of Mfrs.
Bulk Drugs	1333
Formulations	4354
Large Volume Parenterals	134
Vaccines	56
Total	5877

(not 20,000)

Indian Drug Industry - Strengths

- **Mature industry with strong manufacturing base with capacity to produce quality drugs at relatively lower costs.**
- **A very rich base of traditional knowledge in therapeutics i.e. Ayurveda, Sidha & Unani**
- **Well developed engineering base to produce a wide range of pharmaceutical equipment and machinery**
- **Abundance of S&T talent and infrastructure.**
- **Successful experience in innovative process chemistry**
- **Access to brain bank of internationally acclaimed NRI S&T professionals.**

Indian Drug Industry - Weaknesses

- **Sub-critical R&D investments**
- **Lack of truly innovative R&D culture in industry**
- **Poor networking among constituents in the innovation chain**
- **Inadequate framework for clearance of new drug investigation and registration**
- **A policy framework for testing on animals and their import that is not facilitative**
- **Inadequate trained manpower in emerging areas.**

» Contd.

Indian Drug Industry - Opportunities

- **Due to rising costs of R&D overseas, greater opportunity of outsourcing and networking.**
- **Expertise to blend knowledge of traditional medicines with modern science.**
- **Increasing competence in molecular biology, immunology and biotechnology.**
- **Early R&D wins boosting confidence (Reddy's, Ranbaxy's, Dabur's, Shanta Biotech's)**
- **Large number of patients covering wide range of diseases.**
- **Potential for clinical trials.**
- **Major high quality generics supplier.**

Barrier to Entry of Generic Drugs perceived by Indian Industry

- **Filing of patent infringement suits**
- **Paying the generic company for delaying the introduction of the product**
- **Withdrawing the product from the market and reintroducing a new 'version'**
- **Initially a new study of the patented product to enable FDA to approve extension of patent life of the original product by six months.**

India on the Move

New Drug Discovery Programs

Ranbaxy

Dr Reddy's Laboratories

Wockhardt

Torrent

Cadila Healthcare

Cadila Pharmaceuticals

Nicholas Piramal

Glenmark

Orchid

Dabur

Lupin

Major PCT Applicants from India (2002)

Rank	Applicant	No. of Applicants
1	Council of Scientific and Industrial Research (CSIR)	184
2	Ranbaxy Laboratories Limited	56
3	Dr. Reddy's Laboratories Limited	19
4	Orchid Chemicals & Pharmaceuticals Limited	16
5	Biocon India Limited	10
6	Sun Pharmaceutical Industries Limited	8
7	Avestha Gengraine Technologies Pvt. Ltd.	6
8	Khamar, Bakulesh, Mafatlal	6
9	Aurobindo Pharma Limited	5
10	J.B. Chemicals & Pharmaceuticals Ltd.	5
11	Lupin Limited	5
12	Sahajanand Biotech Private Limited	5

MNC To Hold Global Sales Right For Joint Drugs, Leave Out India

Ranbaxy, GSK strike R&D alliance

Our Delhi Bureau

22 OCTOBER

IN WHAT could signal its elevation to the top league in the global pharma scene, Ranbaxy today announced a strategic R&D alliance with GlaxoSmithKline (GSK) under which both the companies will collaborate for drug discovery and clinical development of drugs in six therapeutic areas.

While the financial and commercial terms of the collaboration project are under wraps, Ranbaxy will have the



TWO'S COMPANY

- ▶ Ranbaxy can sell project drugs only in India
- ▶ Co-marketing in US, EU markets possible
- ▶ Indian company to put in \$9 million
- ▶ 5-yr project to make bacterial, fungal, inflammatory, urology, metabolic disorders & diabetic drugs

marketing rights only for India while GSK will have the global marketing rights for the new drugs developed under

this project. The agreement, however, indicates possibility for the two to have co-marketing rights for the US and the EU markets. This, however, will be decided on a case to case basis, sources said.

This is the first time an Indian company is entering into such a comprehensive agreement with a multinational

company in the field of discovery and clinical development for a wide range of drugs. The collaboration is widely seen as a win-win formula for both the companies.

The agreement, initially for

▶ **Net profit up 26%: P 13**

a 5-year period, envisages Ranbaxy and GSK forming an executive steering committee to oversee the research. Both companies will have three-members each on the committee. The issue of who will head the committee is undecided.

▶ **GSK to provide leads: P 6**

A day of global deals

Ranbaxy, Glaxo to collaborate in drug discovery

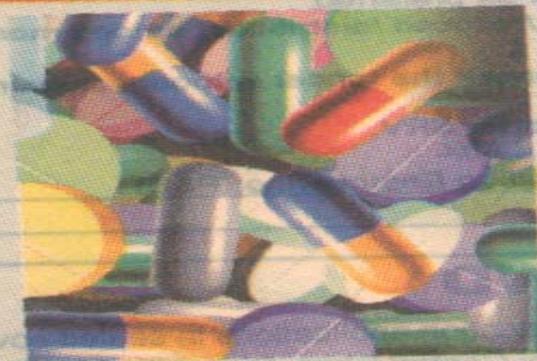
OUR CORPORATE BUREAU
New Delhi, 22 October

Ranbaxy Laboratories, India's largest pharmaceutical company, and GlaxoSmithKline, the world's third largest research-based pharmaceutical company after Pfizer and Novartis, today announced that they had entered into a drug discovery and clinical development collaboration covering a wide range of therapeutic areas.

"This is the first time that Big Pharma has entered into such an alliance with a company from the developing world. It is a red letter day for the Indian pharmaceutical industry," said Sanjiv Kaul, vice president (global li-

Ranbaxy's R&D deals abroad

- ▶ Ciprofloxacin once-a-day outlicensed to Bayer
- ▶ BPH molecule outlicensed to Schwarz, Germany
- ▶ Roche replaced as developing partner for a molecule discovered by Medicines for Malaria Venture, Geneva
- ▶ Alliance with GSK for drug discovery and development



pected that Ranbaxy will conduct early clinical work.

GlaxoSmithKline and Ranbaxy will form an executive steering committee to oversee research. Once a compound is selected as a development candidate, in most cases GlaxoSmithK-

has interests in therapeutic segments like metabolic disorders, anti-infectives, urology and anti-inflammables.

This is Ranbaxy's fourth global collaboration in research and development. It first signed a deal with Bayer for its ciprofloxacin once-

Major PCT Applicants from Developing Countries(2002)

The Director of the United States Patent and Trademark Office

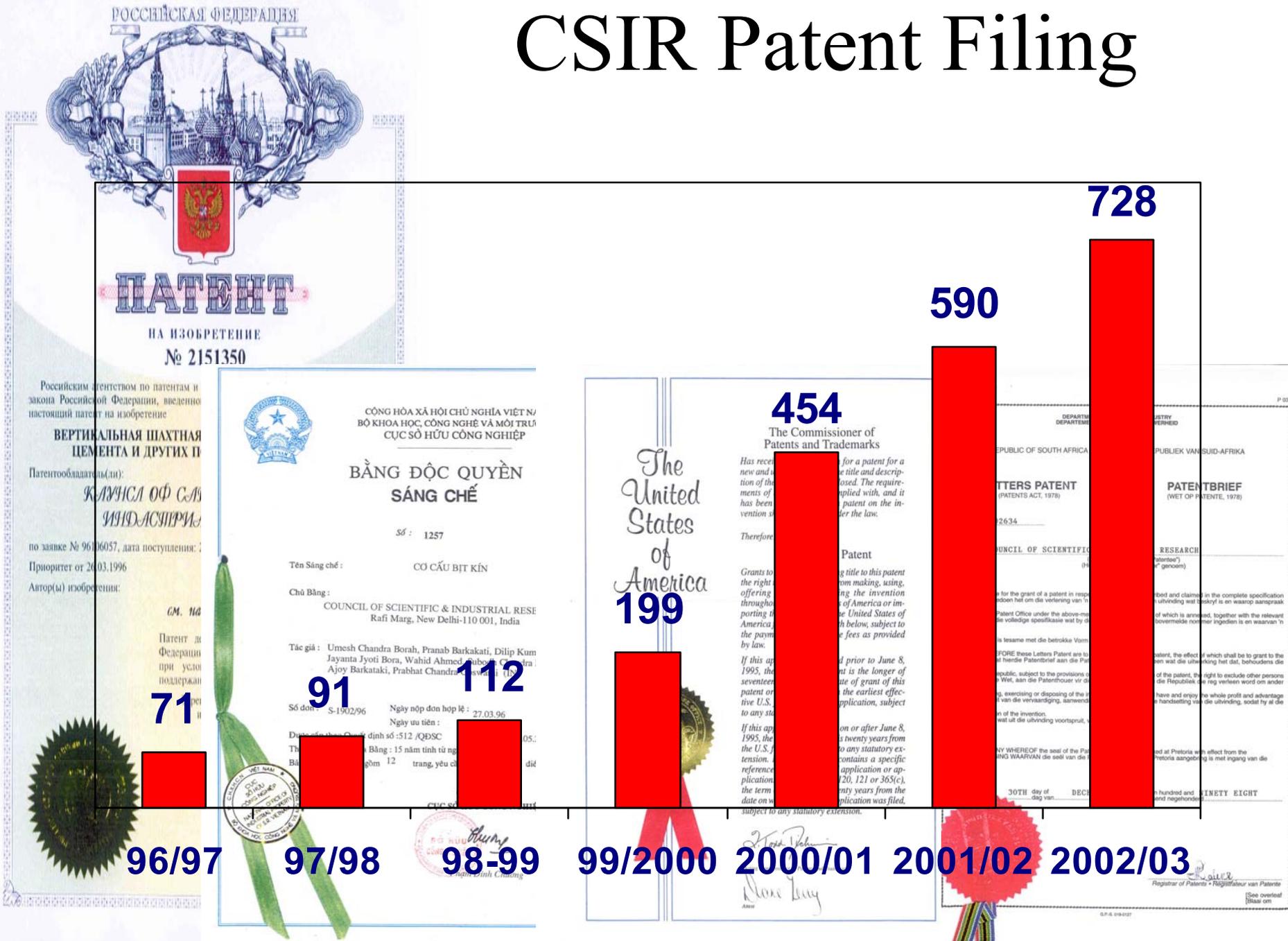
Has received an application for a patent for a new and useful invention. The title and description

Rank	Applicant	Country	No (appl)
1	Council of Scientific & Industrial Research	India	184
	Samsung Electronic Co.	Rep of Korea	184
3	Biowindow Gene Development Inc	China	136
4	LG electronics Inc	China	125
5	Huawaei Technologies Co.	China	84
6	Ranbaxy Laboratories Ltd.	India	56
7	LG Chem Ltd.	Rep of Korea	47
8	SAE Magnetics (H.K.) Ltd.	China	31
9	The National University of Singapore	Singapore	28
10	Philips Electronics Singapore PTE Ltd.	Singapore	24

The United States



CSIR Patent Filing



US Patents Granted to CSIR



Patents (1980 - 2000)



Use of Traditional Medicine

Populations using traditional medicine for primary health care	Ethiopia India Rwanda Tanzania Uganda	90% 70% 70% 60% 60%
Populations in developed countries who have used complementary and alternative medicine at least once	Canada Australia France USA Belgium	70% 48% 49% 42% 31%

Traditional Medicine



**Modern
Medicine**

**Modern
Science**

Gugulipid – An Inspiring Story

- Utility of guggulu in treating lipid disorders
 - Sushrutta Samhita (600BC)
- Guggul – hypolipidemic effect
 - BHU(1964)
- Guglip – hypolipidemic drug
 - CDRI, 1981
- Scientific basis for Guglip action
 - 1984-88 Scientific Journals
- New exciting science follows in major journals (2002)

रसनिमित्तमेव स्थौल्यं काश्यं च। तत्र श्लेष्मलाहार-
 सेविनोऽध्यशनशीलस्याव्यायामिनो दिवास्वप्नरतस्य चाम
 एवान्नरसो मधुरतश्च शरीरमनुक्रमन्नतिस्नेहान्मेदो जनयति,
 तदतिस्थौल्यमापादयति, तमतिस्थूलं क्षुद्रश्वासपिपासाक्षुत्स्वप्न-
 स्वेदगात्रदौर्गन्ध्यक्रथनगात्रसादगद्गदत्वानि क्षिप्रमेवाविशन्ति,
 सौकुमार्यान्मेदसः सर्वक्रियास्वसमर्थः कफमेदो निरुद्धमार्गत्वा-
 च्छाल्पव्यवायो भवति, आवृतमार्गत्वादेव शोषा धातवो नाप्या-
 यन्तेऽत्यर्थमतोऽल्पप्राणो भवति, प्रमेहपिडकाज्वरभगन्दरविद्र-
 धिवातविकाराणामन्यतमं प्राप्य पञ्चत्वमुपयाति, सर्व एव चास्य
 रोगा बलवन्तो भवन्त्यावृतमार्गत्वात् स्रोतसाम्, अतस्तस्योत्पत्ति-
 हेतुं परिहरेत्। उत्पन्ने तु शिलाजतुगुग्गुलुगोमूत्रत्रिफलालोहरजो-
 रसाञ्जनमधुयवमुद्गकोरदूषकश्यामाकोदूदालकादीनां विरूक्ष-
 णच्छेदनीयानां च द्रव्याणां विधिवदुपयोगो व्यायामो लेखनबस्त्यु-
 पयोगश्चेति।

Fig. 1. Original Sanskrit text from *Sushruta Samhita* (*Sootras-
 thanam* : 15 : 32) which inspired the very first study on
 the hypolipidemic effect to gum *guggul* at BHU, Varanasi, in
 1964-66.

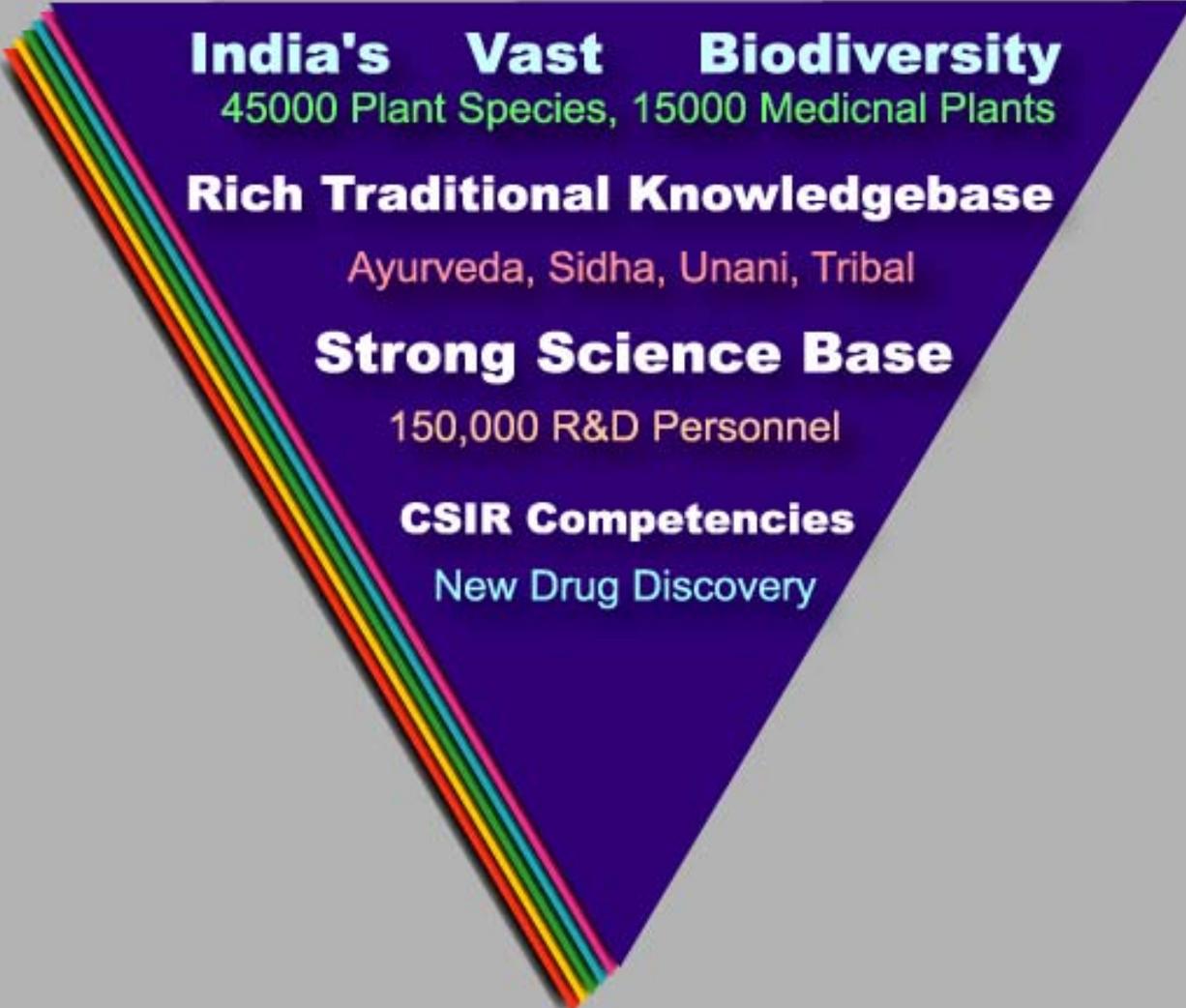
Excitement !

It is an intriguing possibility that characterization of the efforts of natural products on such receptors will identify agents that like guggulsterone have more desirable activities

Virazar et.al. , Science (2002)

**Guggulsterone highly
efficacious antagonists of
Formesoid-x receptor, a
nuclear hormone receptor
activated by bile acids**

Virazar et.al. , Science (2002)



India's Vast Biodiversity

45000 Plant Species, 15000 Medicinal Plants

Rich Traditional Knowledgebase

Ayurveda, Sidha, Unani, Tribal

Strong Science Base

150,000 R&D Personnel

CSIR Competencies

New Drug Discovery

Bioactive Molecule Discovery & Development

A Coordinated Programme

**Natural
Resources**

**Modern
Science**

**Traditional
Knowledge**

To Create

**A Virtual Organisation Through
Networking**

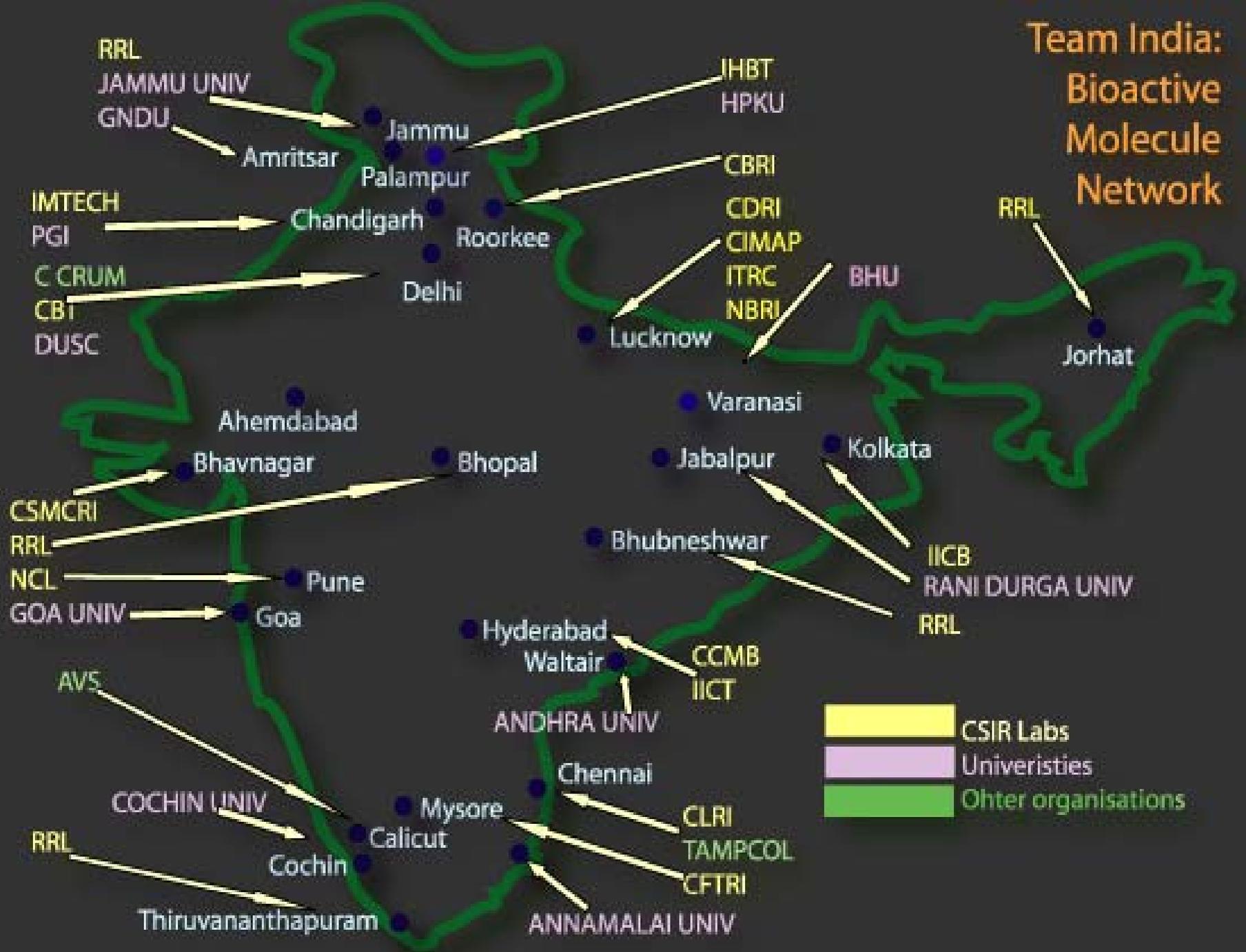
CSIR

Univ

Experts

**User
Industry**

Team India: Bioactive Molecule Network



BIO-SCREENING CAPABILITIES

DEGENERATIVES

METABOLIC DISORDERS

CNS

TROPICAL

INFECTIVES

OTHERS

INVITRO/INVIVO SCREENING

IGIB

CDRI

CIMAP

IICT

IICB

IMT

RRL,J

ITRC

CCMB

ALZHEIMER

ATHEROSCLEROSIS

BACTERIAL

CANCER

DEPRESSION

DIABETICS

FILARIASIS

FUNGAL

GASTRIC ULCER

HEPATITIS

HYPERTENSION

IMMUNODEFICIENCIES

INFLAMMATION

LEISHMANIA

MALARIA

MEMORY REDUCTION

NEURO DISORDERS (3)

PARKINSONIAN

TRANSGENIC ANIMAL MODELS EMPLOYED

First level Positives from AVS drug Screening (1998 - 2002)

SAMPLES RECEIVED

67 FORMULATIONS

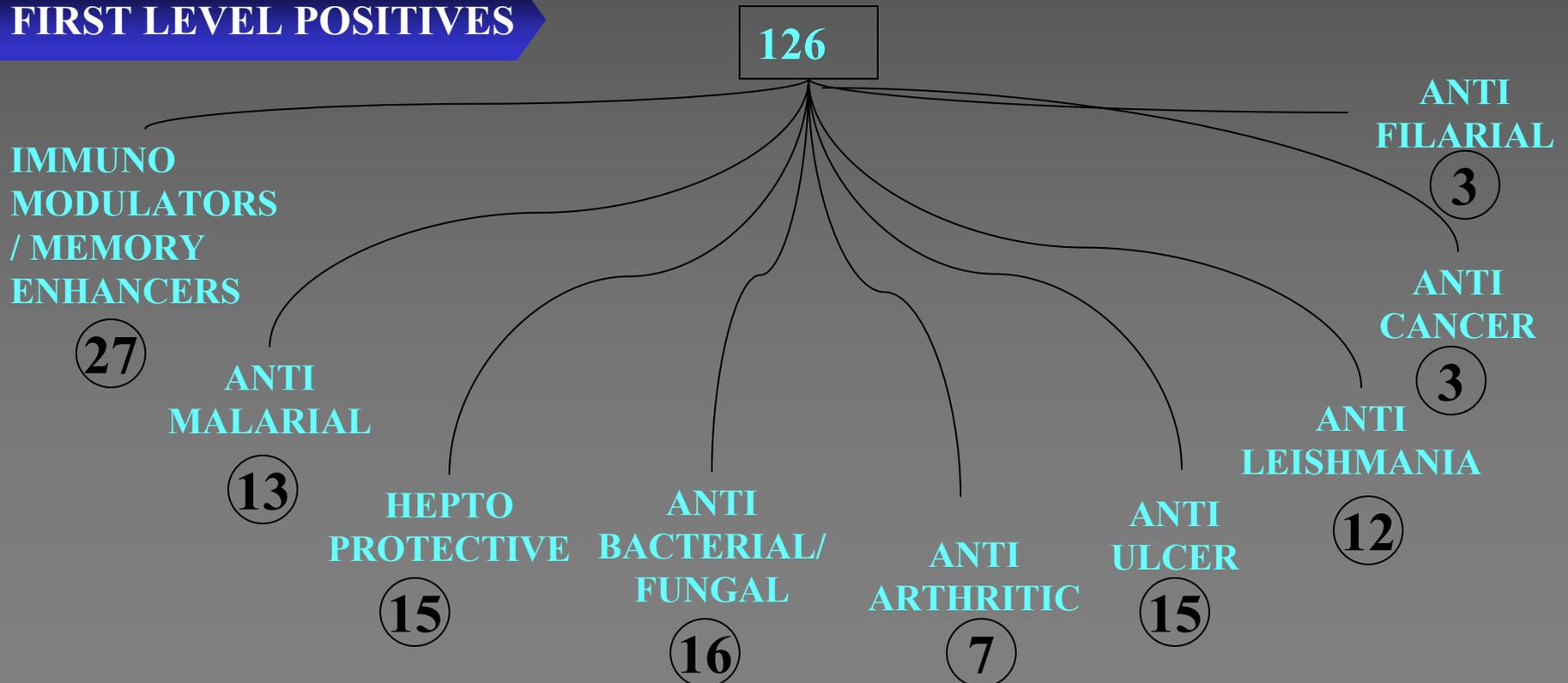
EXTRACTS PREPARED

197

EXTRACTS DISTRIBUTED

3342 (6 LABS AND 18 DISEASES)

FIRST LEVEL POSITIVES



200 ml.



ASMONTM

SYRUP



An I.I.C.B (Kolkata)
(C.S.I.R.)
formulation

SHAKE WELL BEFORE USE.
STORE IN A COOL & DARK PLACE

ASMON

- Polyherbal medication provides relief in bronchial asthma
- Blocks both, leukotriene and lymphotriene causing asthma
- Available in convenient liquid and capsule form

For safe Prompt and Prolong Relief

**A Product of I.I.C. B.
(Kolkata)
(Unit of C.S.I.R.)**

ASMONTM
CAPSULE

AYURVEDIC MEDICINE

10 Capsules

STORE IN A COOL, DRY & DARK PLACE





Converting Traditional Knowledge into Modern Science

ASMON - Why does it work

Inhibition of 5 lipooxygenase activity leading to supression of leukotriene

Supression of Th2 cytokine production i.e. suppress IL-4 production

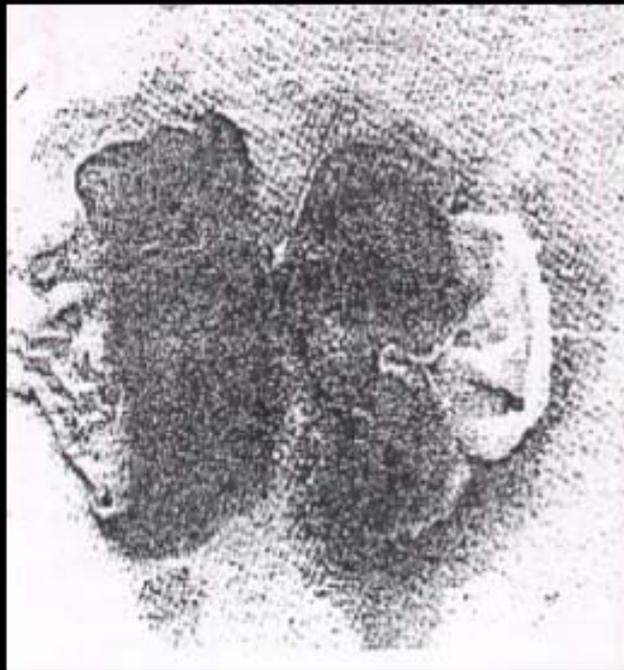
Enhancement of Th1 cytokine production i.e. IFN- γ production

Reduction of IgE production

An I.I.C.B (Kolkata)
(C.S.I.R.)
formulation
SHAKE WELL BEFORE USE
STORE IN A COOL & DARK PLACE

Ethanol Induced Ulceration

Control



Treated



Designing New Ulcer Treatment

A AVS-IICT-CDRI endeavour

CONSTITUENTS	AP-19	AP-20	AP-75K	AP-76p	OMEPRAZOLE
A	a₁	a₂	a₃	a₄	-
B	b₁	b₂	b₃	-	-
C	-	-	c₃	-	-
D	-	-	-	d₄	-
Ulcer Index	50	80+	87	100	50
Candidates	Utility patents		New product patents		

17 Feb 2003



MNC-OWNED R&D CENTRES IN INDIA

COMPANY	INDUSTRY	LOCATION
Bell Labs	Telecom	Bangalore
Boeing	Aerospace	Gurgaon
Colgate India	FMCG	Mumbai
Cummins	Engineering	Pune
Daimler Chrysler	Auto	—
Deloitte	Auto	Bangalore
El Lilly	Pharmaceutical	Gurgaon
DuPont	Chemical	Bangalore, Hyderabad, Chennai, Kolkata
Daimler Chrysler	Auto	Bangalore
El Lilly	Pharmaceutical	Gurgaon
GE Indl. Systems	Electrical	Bangalore
GE Medical Systems	Medical equipment	Bangalore
GE Power	Electrical	Bangalore, Pune
General Electric	Engineering	Bangalore
General Motors	Auto	Bangalore
Hewlett-Packard	IT Services	Bangalore
Hewlett-Packard	IT Services	Bangalore
Intel	IT Services	Bangalore
Intel	IT Services	Bangalore
National Instruments	IT Services	Bangalore
National Instruments	IT Services	Bangalore
Philips	Electronics	Chennai
Qualcomm	IT Services	—
Samsung	Engineering	Chennai
Texas Instruments	IT Services	Bangalore
Unilever	Pharmaceutical	Chennai, Bangalore
Unilever	Consumer Goods	Pune, Pondicherry

Chemical Engineering News

Mar 24 2002

China may become not only the world's manufacturing base, but also the place where products are researched and developed.



MODERN Shanghai's recently renovated infrastructure, including a slew of skyscrapers, underscores its importance as China's leading business center.

DOING RESEARCH IN SHANGHAI

A growing number of foreign companies are setting up R&D facilities in China's showcase city

JEAN-FRANÇOIS TREMBLAY, C&EN HONG KONG

China may become not only the world's manufacturing base, but also the place where products are researched and developed.

A growing group of well-known multinational companies have set up R&D facilities in Shanghai, which recently opened the third of its three global research facilities. The other two are located in New York and Bangalore, India. GE sees the Shanghai investment with interest, but for now the firm is doing significant information about the status of the facility. The GE R&D research website can also be accessed merely years after a "merger" is already in progress.

growing number of researchers began country work in Shanghai. In January, Johnson & Johnson began work of a \$100 million Shanghai R&D center.

India's emergence as global R&D platform

- **100 global players set up R&D centres in India in last five years**
- **General Electric R&D Centre – expanding to 2400 employees!**
- **Advantage India –**
 - **S&T budget 2002 - \$ 5 billion**
 - **Pfizer budget 2002 > \$ 5 billion**
- **Strong networking with public R&D too**

Public Private Partnership

Partners

- **For profit companies (Pharma)**
- **Not for profit organisation**
 - **s**
 - **Foundations**
 - **Philanthropic institutions**
- **International organisations**
- **Development & Aid Agencies**
- **Government**
- **Academia**

Some PPPs

- **International Aids Vaccine Initiative**
- **Global alliance for TB Drug Development**
- **Roll Back Malaria**
- **Medicines for Malaria Venture**
- **Others**

Global Funding – Which Sources?

Private foundations

Bilateral donors

International organizations

**Private foundations in
developing countries**

**Shifting priorities in developing
countries**

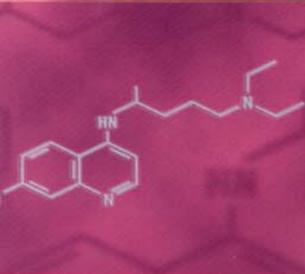
Industry

Societal perception of the moral quality of "Big Pharma" and the way it assumes its social responsibility



Klaus M. Leisinger, October 7th 2003

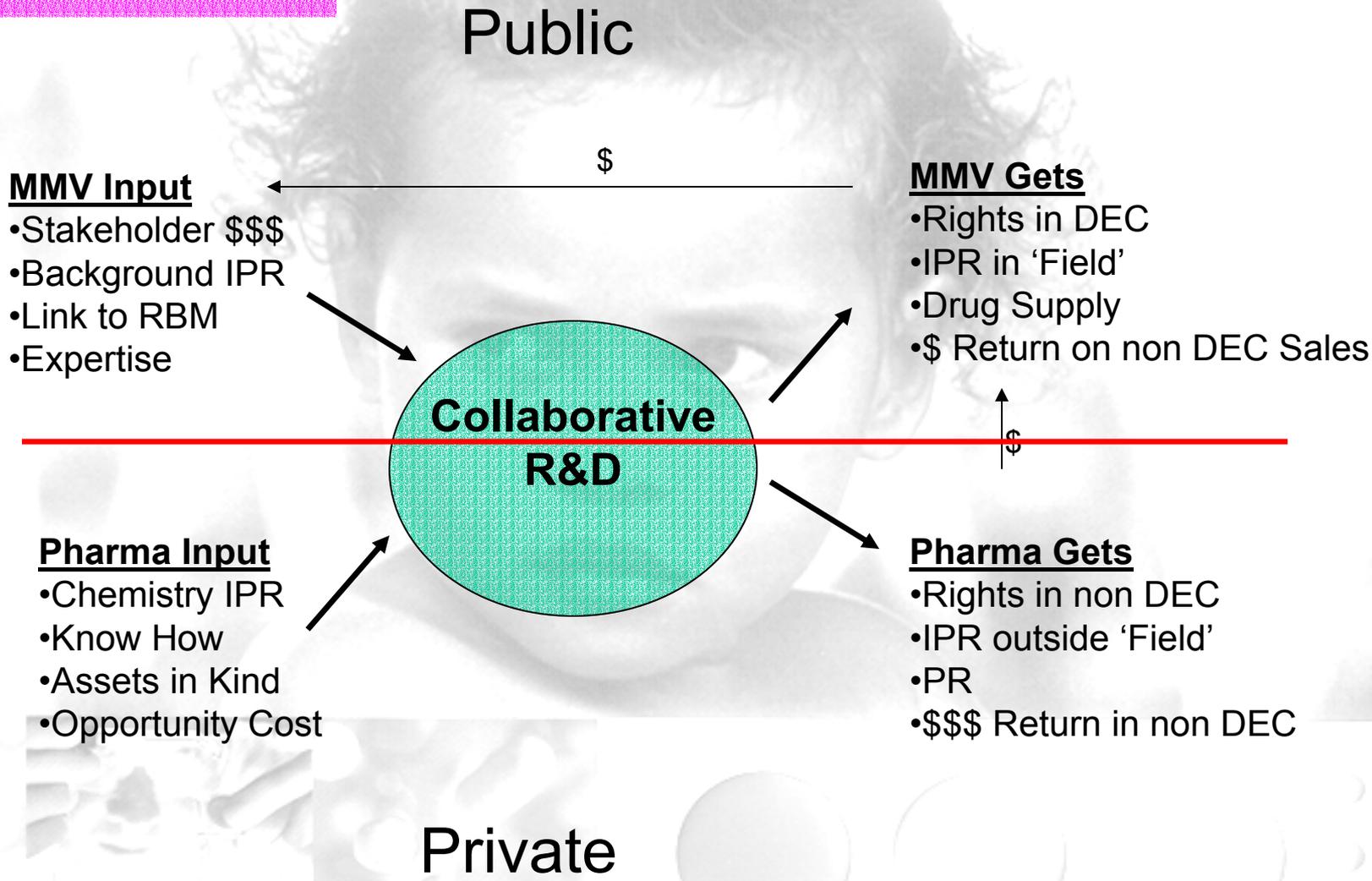
Novartis Foundation for Sustainable Development



Medicines for Malaria Venture

A nonprofit foundation

The PPP value proposition:



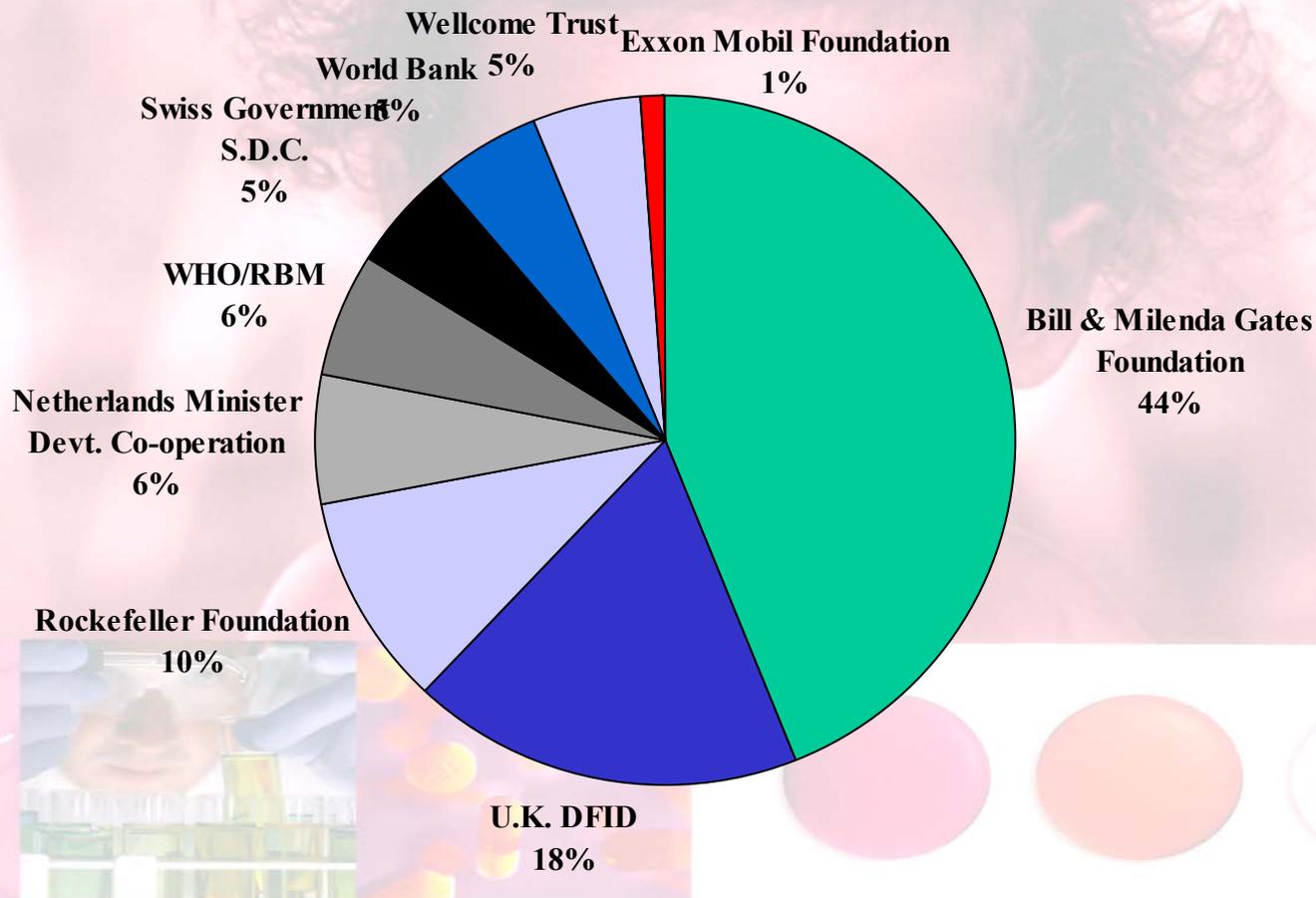
Key Partners in current MMV projects

Annual Report 2002

Large Pharma	Small Pharma	Academia
<p>Bayer Bristol Myers Squibb GSK Roche Novartis</p>	<p>Jacobus S-P Korea Ranbaxy, India</p>	<p>Bristol, UK HKUST Hong Howard Kong Hughes USA LSHTM, UK Leeds UK Mahidol Thailand Monash Australia Nebraska USA STI, Switzerland Texas A & M USA Washington USA WRAIR USA Yale USA UC Berkeley USA USA</p>

MMV Funding March 2003

Total \$55 million



Medicines for Malaria Venture

A nonprofit foundation

PPP Global Chain

- **Scientists at the University of Nebraska discovered Synthetic Peroxide. Roche Pharma partner**
- **Funding from WHO/TDR**
- **MMV funding including for Swiss Tropical Institute and Monash University**
- **Roche hands over to Ranbaxy as Development Partner.**



**Global knowledge pool
for global good through
global funding**

IPR Commission - Some Final Thoughts

Some Final Thoughts

For too long IPRs have been regarded as food for the rich countries and poison for poor countries. It is not as simple as that. Rich countries can get indigestion from overindulgence. And poor countries may find them a useful dietary supplement provided they are accommodated to suit local palates and not force-fed. The appropriate diet for each developing country needs to be decided on the basis of what is best for its development. It is this guiding principle that should help the national governments and international community to arrive at rational decisions, which can help integrating intellectual property rights into a balanced development policy



