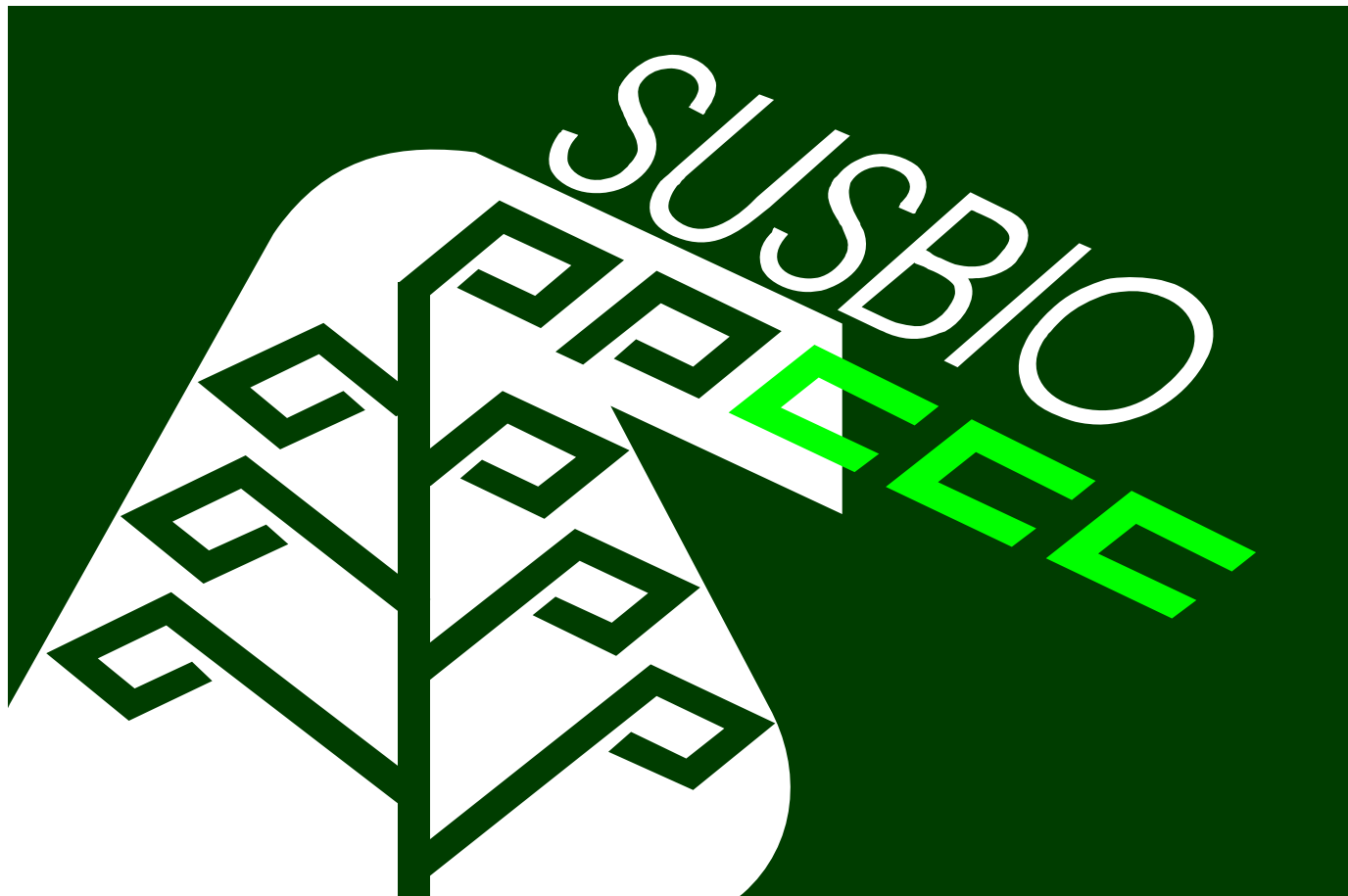


CNCTI- DESENVOLVIMENTO SUSTENTAVEL – Maio 2010

BIODIVERSIDADE

Luiz Antonio Barreto de Castro
Secretario de Pesquisa e Desenvolvimento -MCT



SUSTAINABLE USE OF BIODIVERSITY

MODEL PROPOSAL FOR BRASIL
MINISTRY OF SCIENCE AND TECHNOLOGY-BRASIL
AUGUST/1994

A IMPORTANCIA DA BIODIVERSIDADE

Paterson I., Andersen E.A., ***The Renaissance of Natural Products as Drug Candidates.*** Science 310:451 (2005)

Around half of the drugs currently in clinical use are of natural product origin.

Vimblastina, Vincristina - Anticancerígenos

Pilocarpina-Colírio Anti glaucoma

Artemisina - Antimalárico

BIOECONOMIA

Industrial biotechnology sales soar

The demand for plant-based chemicals is growing so fast that the industry could generate sales of as much as £12bn in the UK

Tom Bawden

The demand for plant-based chemicals, which are used in everything from skin cream to car tyres, is growing so fast that the industry could generate sales of as much as £12 billion in the UK and £360 billion globally by 2025, according to research.

Industrial biotechnology — manipulating the cells of plants and other biological resources to create chemicals — is increasingly used to make ingredients that have traditionally been generated using oil and other fossil fuels.

Goodyear is working on a bio-based alternative to isoprene, a chemical compound derived from petrol that it uses in the production of synthetic rubber for its tyres.

Boots teamed up with the Centre for Novel Agricultural Products at the University of York last year and created a hand cream that incorporates fatty acids from hemp plant oil.

Times June 1st 2009

Acheflan



achē

Medicamento desenvolvido com a *Cordia verbenacea*, uma planta medicinal brasileira.

Atletas ou praticantes de esportes eventualmente necessitam fazer uso de anti-inflamatórios em caso de contusões. Esses medicamentos, entretanto, muitas vezes trazem consigo diversos efeitos colaterais. Há 20 anos, um dos fundadores do Aché machucou-se durante uma partida de futebol em seu sítio e foi tratado pelo caseiro com compressas de erva-baleeira, planta nativa da Mata Atlântica. Impressionado com os resultados, incentivou o início de pesquisa para a elaboração de um anti-inflamatório à base de planta. Lançado em 2005, o Acheflan alcançou, em apenas um ano, a liderança do mercado brasileiro de anti-inflamatórios de uso tópico com prescrição médica e conquistou vários prêmios de inovação tecnológica. Em 2007, com o surgimento da nova apresentação em aerosol, foram vendidas cerca de 700 mil unidades do produto. Em 2008 chegou ao mercado americano e canadense, sendo usado por atletas da NBA e da NFL, ligas americanas de basquete e futebol, respectivamente.

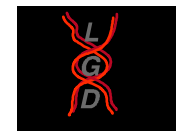
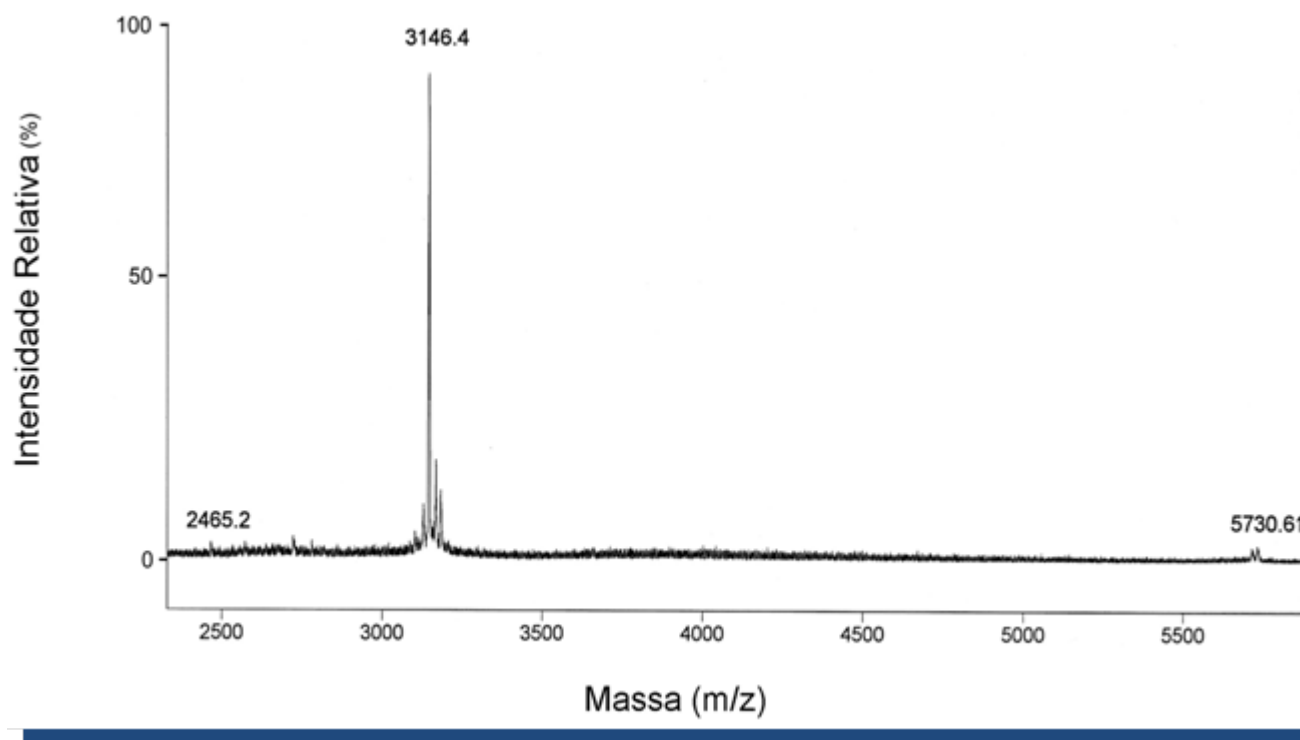
**DERMASEPTINS : ANTIFUNGIC PEPTIDES FROM FROGS FOUND IN PLANT
GENOMES WERE THEY CAN BE ENGINEERED TO PERFORM THE SAME
FUNCTIONS THE NEW CONCEPT IS CALLED INTRAGENICS**

Carlos Bloch – CENARGEN/EMBRAPA



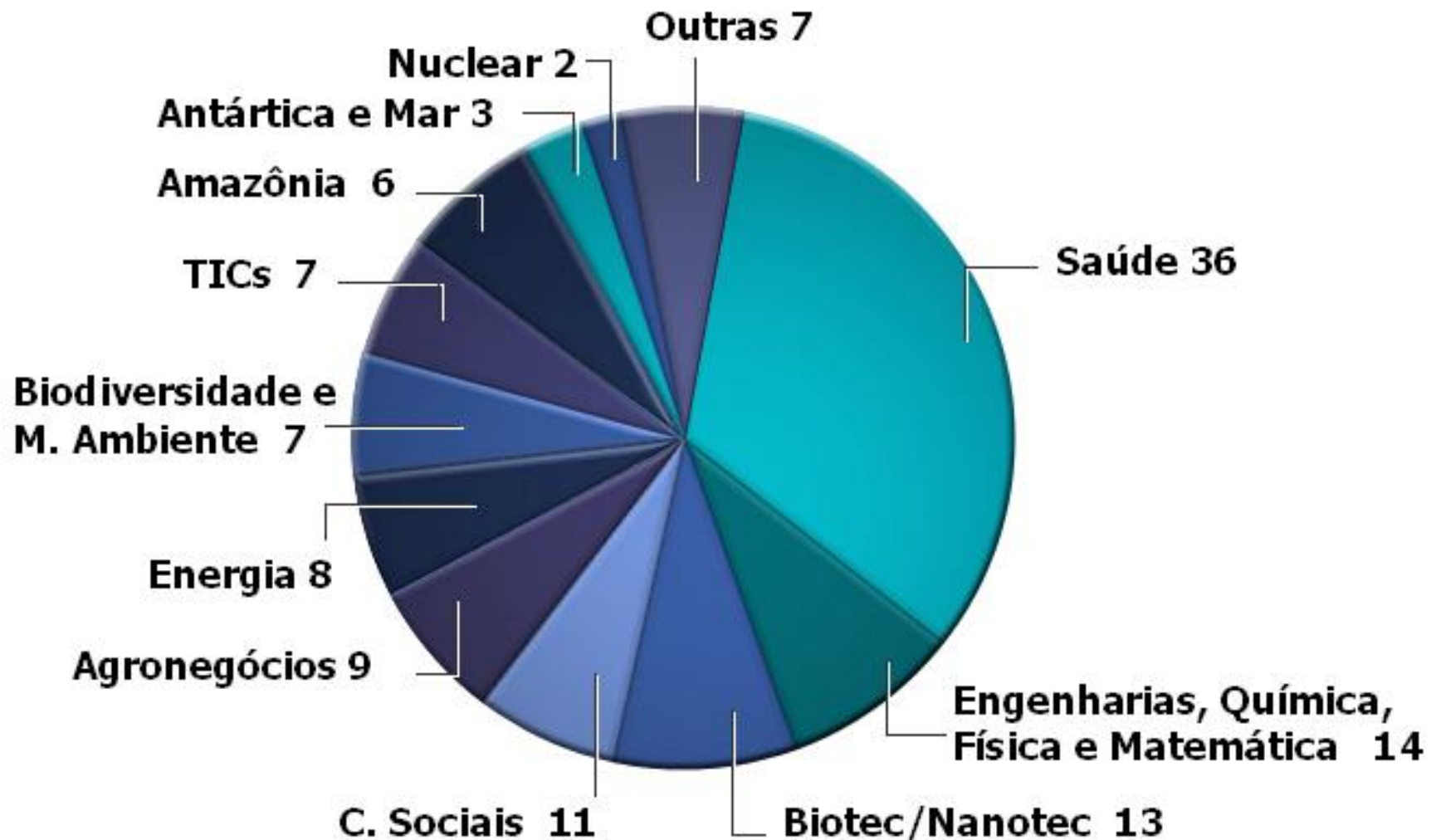


ANTI FUNGIC PEPTÍDE - MOLECULAR MASS DETERMINED BY MALDI-TOF/MS

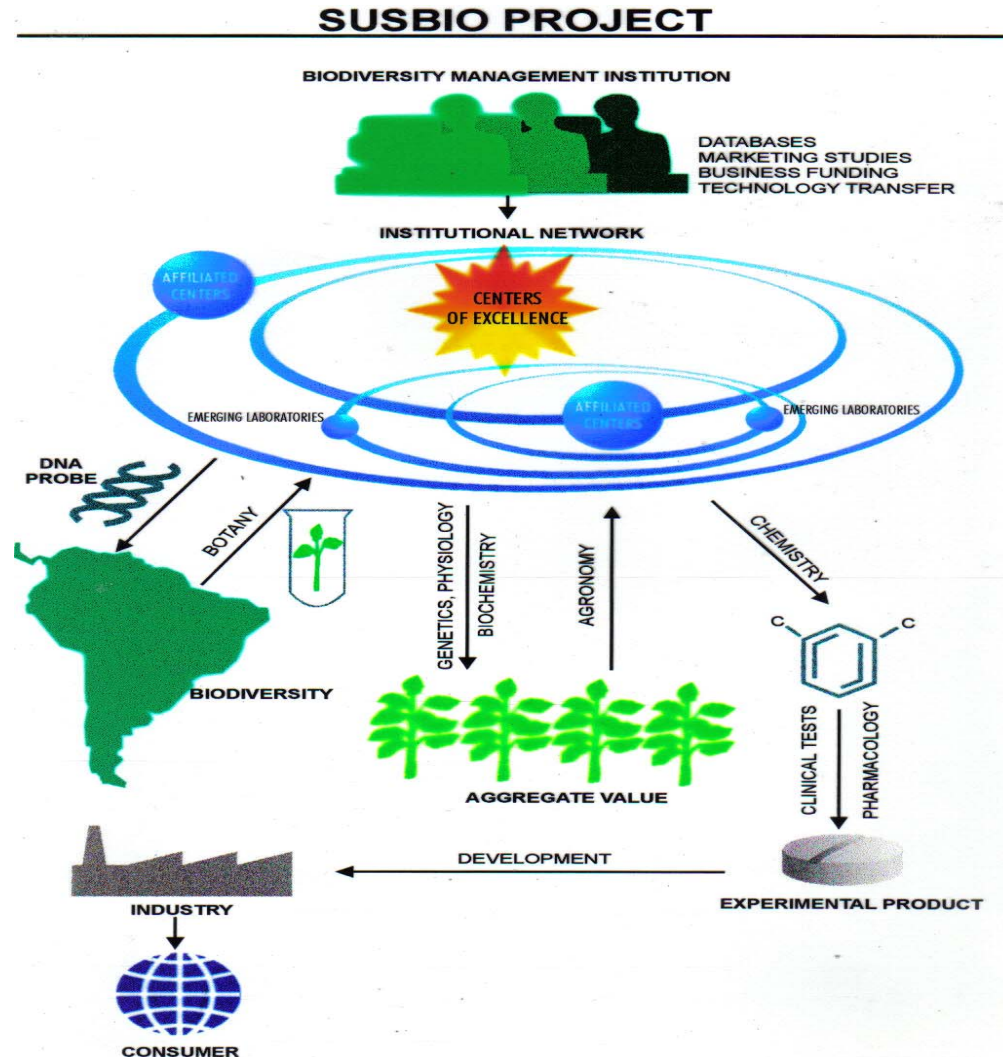


**NATIONAL INSTITUTES FOR SCIENCE AND TECHNOLOGY FUNDED IN
2008 BY THE MINISTRY OF SCIENCE AND TECHNOLOGY
US\$ 200 MILLION – 36 in the area of health**

INCT - 123 APROVADOS



AGREGATE VALUE TO THE PRODUCTS OF BIODIVERSITY – A STRATEGY TO REVERT THE TREND OF DEFORESTATION IN THE AMAZON



Source: CASTRO, L. A. B. . Sustainable use of Biodiversity - Components of a Model Project for Brazil. Brazilian Journal of Medical and Biological Research, v. 29, p. 687-689, 1996.

The Genetic Map of *Artemisia annua* L. Identifies Loci Affecting Yield of the Antimalarial Drug Artemisinin

Ian A. Graham,^{1,*} Katrin Besser,¹ Susan Blumer,¹ Caroline A. Branigan,¹ Tomasz Czechowski,¹ Luisa Elias,¹ Inna Guterman,¹ David Harvey,¹ Peter G. Isaac,² Awais M. Khan,¹ Tony R. Larson,¹ Yi Li,¹ Tanya Pawson,¹ Teresa Penfield,¹ Anne M. Rae,¹ Deborah A. Rathbone,¹ Sonja Reid,¹ Joe Ross,¹ Margaret F. Smallwood,¹ Vincent Segura,¹ Theresa Townsend,¹ Darshna Vyas,¹ Thilo Winzer,¹ Dianna Bowles^{1,*}

Artemisinin is a plant natural product produced by *Artemisia annua* and the active ingredient in the most effective treatment for malaria. Efforts to eradicate malaria are increasing demand for an affordable, high-quality, robust supply of artemisinin. We performed deep sequencing on the transcriptome of *A. annua* to identify genes and markers for fast-track breeding. Extensive genetic variation enabled us to build a detailed genetic map with nine linkage groups. Replicated field trials resulted in a quantitative trait loci (QTL) map that accounts for a significant amount of the variation in key traits controlling artemisinin yield. Enrichment for positive QTLs in parents of new high-yielding hybrids confirms that the knowledge and tools to convert *A. annua* into a robust crop are now available.

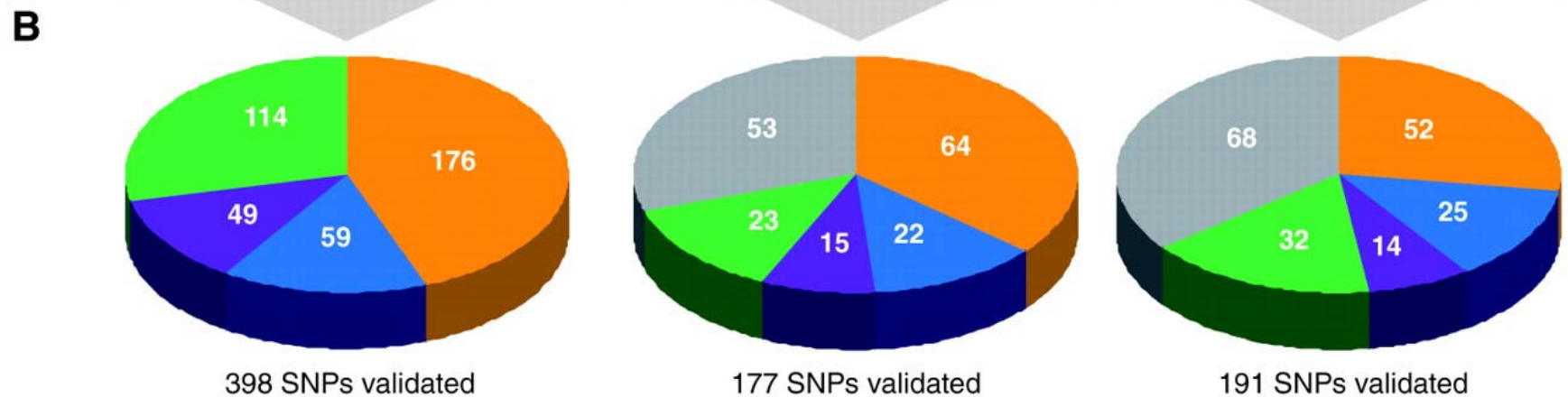
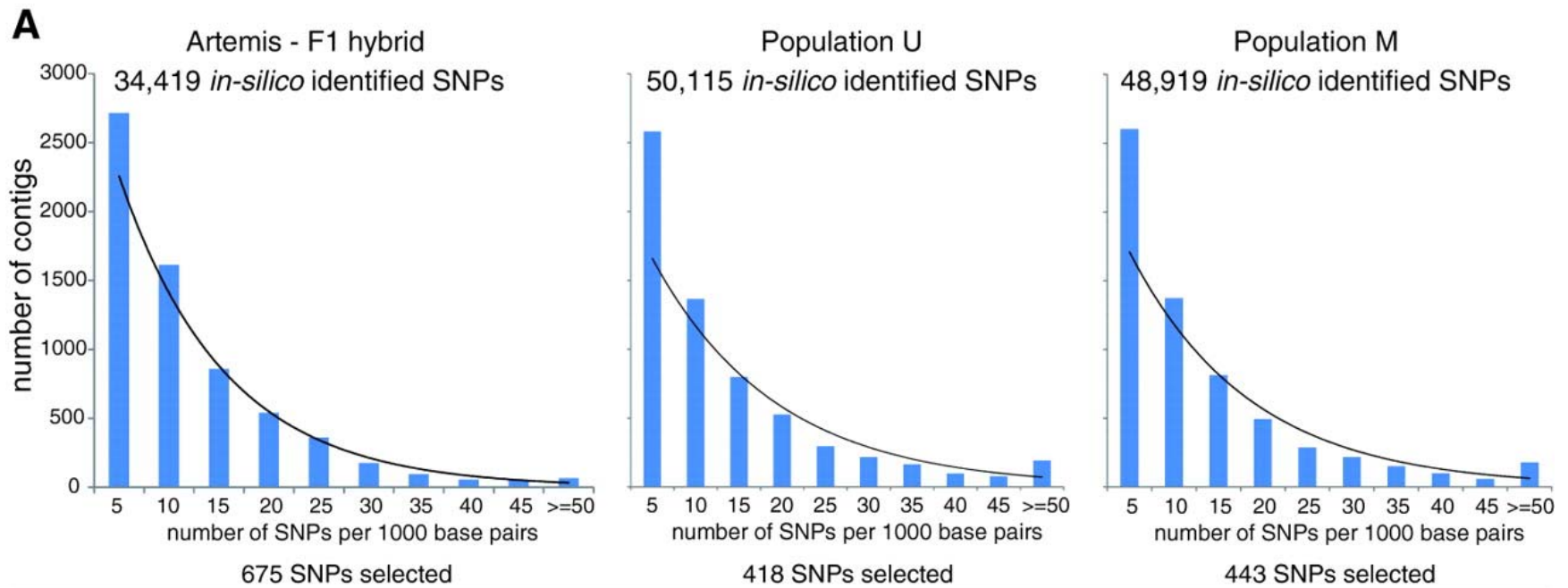
1 Centre for Novel Agricultural Products, Department of Biology, University of York, York YO10 5YW, UK.

2 IDna Genetics Ltd., Norwich Research Park, Norwich NR4 7UH, UK.

•To whom correspondence should be addressed. E-mail: IAG1@YORK.AC.UK (I.A.G.); DJB32@YORK.AC.UK (D.B.)

Fonte: *Science* 15 January 2010: Vol. 327. no. 5963, pp. 328 – 331- DOI: 10.1126/science.1182612

<http://www.sciencemag.org/cgi/content/full/327/5963/328>



Malaria : Resistência do parasita as drogas

- The malaria parasite is capable of becoming resistant to the action of anti-malaria drugs. This is due to small changes in the parasite DNA (point mutations). Over-prescription of anti-malarials and the uncontrolled selling of poor quality drugs contribute to the increase in drug resistant parasites.
- The widespread and increasing occurrence of *P. falciparum* resistant against affordable anti-malarial drugs, such as chloroquine (CQ) and sulphadoxine-pyrimethamine (SP) is more and more hampering the fight against malaria. CQ and SP are still the most widely used drugs for treatment in most of Africa, because of low cost and availability. However, when more than 30% of treatments fail, as is the case in many parts of Africa, change to another first-line treatment is recommended. At present, the World Health Organisation recommends that all countries experiencing resistance to conventional mono-therapies, such as chloroquine or sulfadoxine-pyrimethamine, should use combination therapies, preferably artemisinin-based combination therapies (ACTs) for *P. falciparum* malaria. Artemisinin-based combination therapy (ACT) uses a combination of anti-malaria drugs, one of which is an artemisinin derivative (e.g. artesunate, artemether or dihydroartemisinin). Artemisinin can be extracted from a plant, *A. annua*. Under the name 'Qinghaosu', it has been used in traditional Chinese medicine to treat fever for 2000 years

The critical mass and the regional unbalance

Regional Networks established

Northeast , North , and Center West

- ✓ RENORBIO
- ✓ BIONORTE
- ✓ CONCERRADO
- ✓ PROCENTROESTE

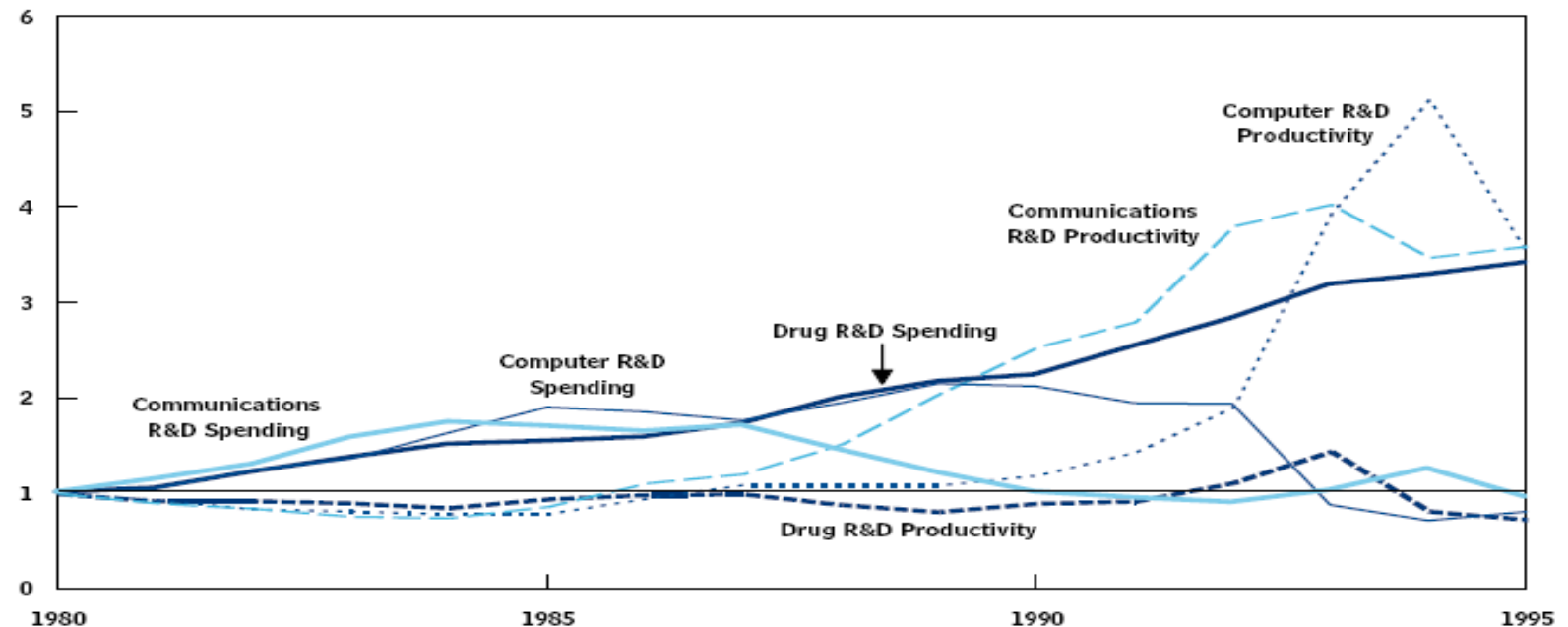


A INDUSTRIA FARMACEUTICA MUNDIAL : A CRISE NO MODELO

Figure 5-2.

Research and Development Spending and Productivity for Various U.S. Industries

(Index, 1980 = 1.0)



Source: Congressional Budget Office based on National Science Foundation table "Company and Other (Except Federal) Funds for Industrial R&D Performance, by Industry and by Size of Company: 1953-98," available at www.nsf.gov/statistics/iris/search_hist.cfm?indx=10; and Bronwyn H. Hall, Adam B. Jaffe, and Manuel Tratjenberg, *The NBER Patent Citation Data File: Lessons, Insights, and Methodological Tools*, Working Paper No. 8498 (Cambridge, Mass.: National Bureau of Economic Research, October 2001).

Notes: This figure measures productivity as the number of patents granted in an industry per dollar of research and development spending. R&D spending in one year is compared with successful patents two years later, reflecting the lag with which such spending leads to patent applications.

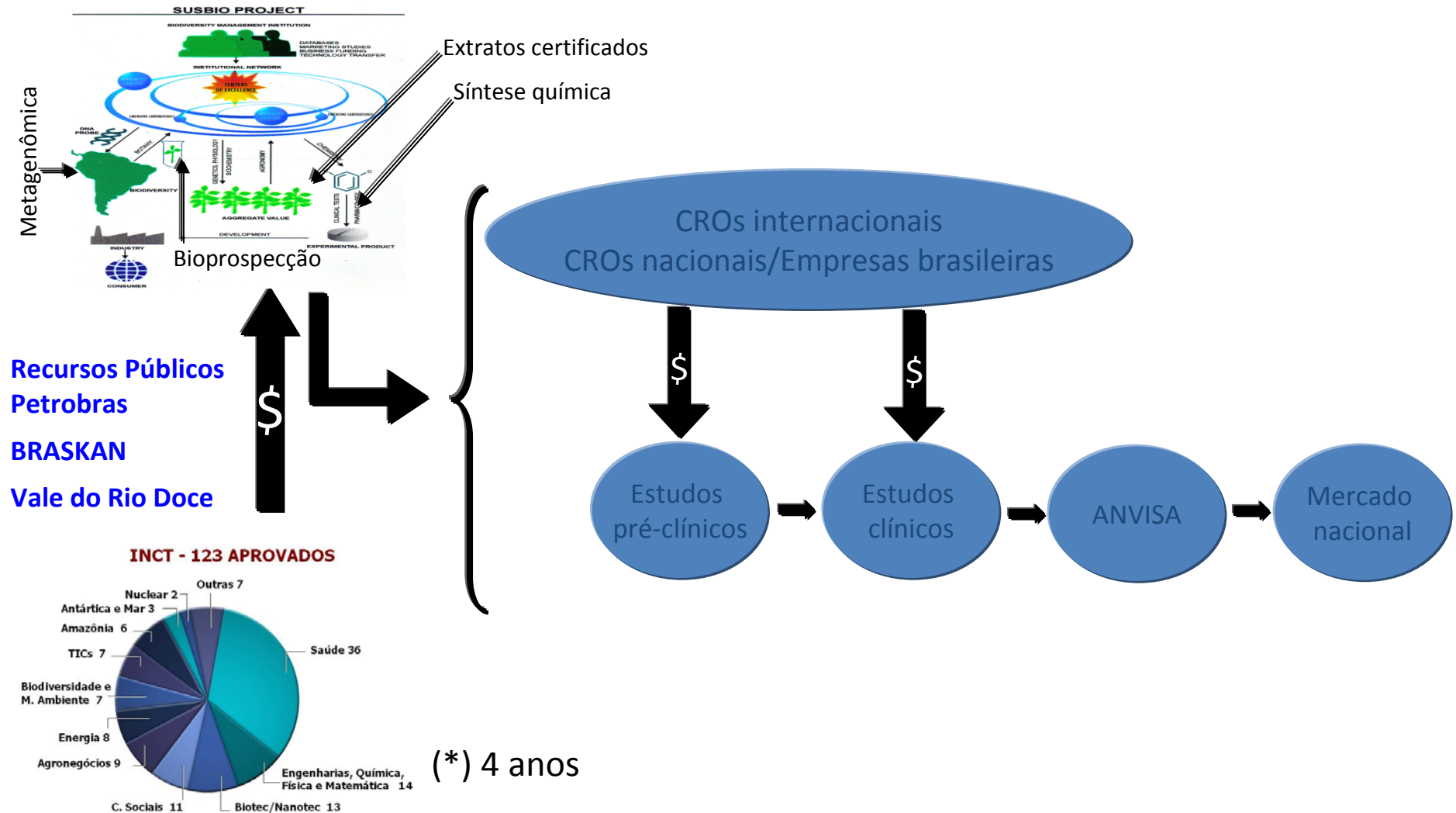
CBO. R&D in the Pharma Industry (2006) www.cbo.gov

Objetivos da Convenção sobre Diversidade Biológica

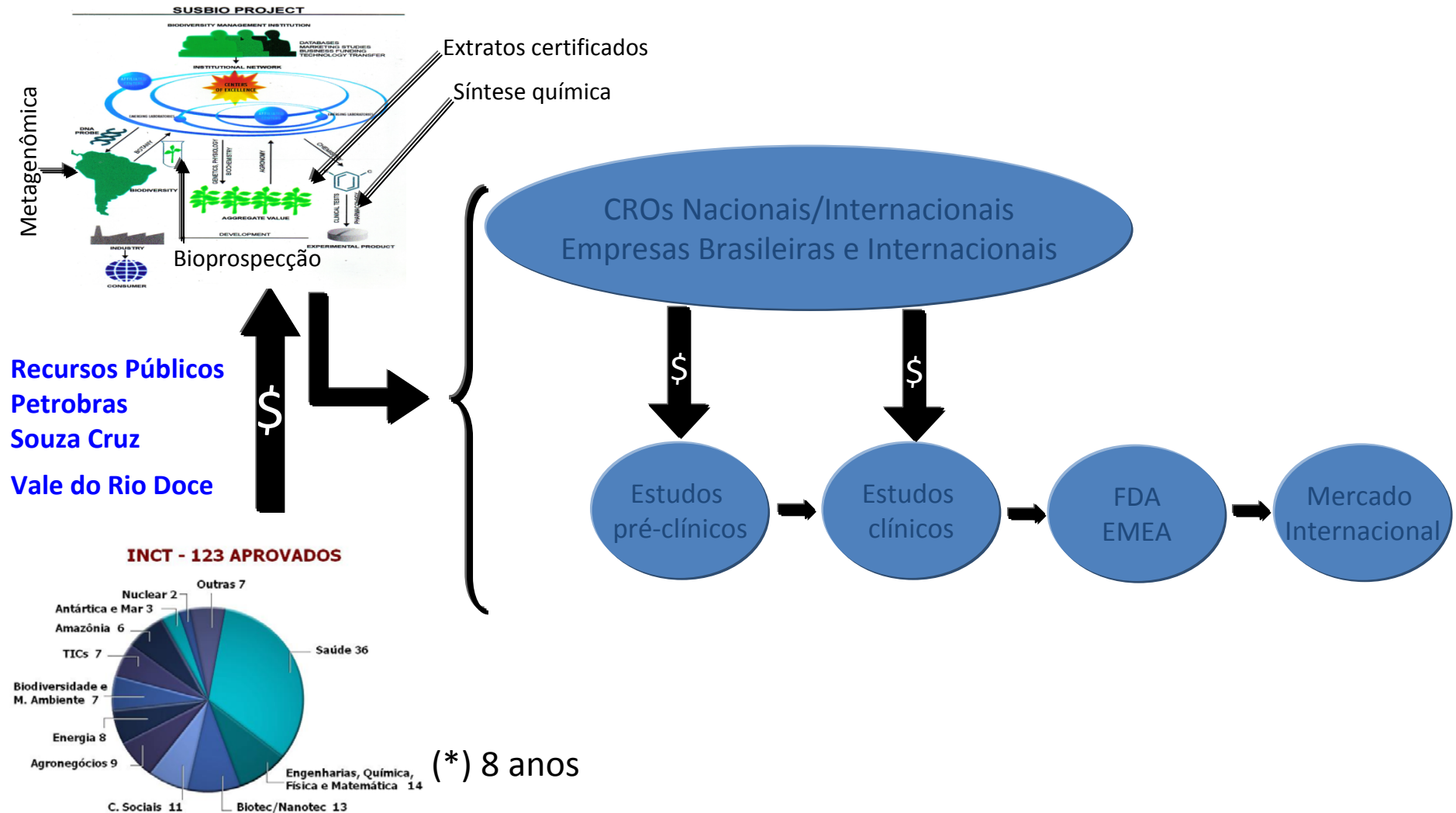
“ conservação da diversidade biológica, a utilização sustentável de seus componentes e a **repartição justa e eqüitativa dos benefícios derivados da utilização dos recursos genéticos**, mediante, inclusive, o acesso adequado aos recursos genéticos e a transferência adequada de tecnologias pertinentes, levando em conta todos os direitos sobre tais recursos e tecnologias, e mediante financiamento adequado ” .

A CDB no seu preâmbulo estabelece que as partes contratantes da CDB são os Estados (Países) : Os Estados têm direitos soberanos sobre os seus próprios recursos biológicos.

Uma plataforma para viabilizar a indústria farmacêutica no Brasil – Fase 1*



Uma plataforma para viabilizar a indústria farmacêutica no Brasil – Fase 2*



A CRISE BRASILEIRA

O numero de expedicoes de coleta na EMBRAPA/CENARGEN vem diminuindo nos ultimos dez anos porque o prazo para autorizacao pelo CGEN pode chegar a quatro anos .Ainda assim centenas de depositos de patentes relacionadas com a biodiversidade todas oriundas de instituicoes publicas brasileiras chegaram ao INPI desde 2000 e nao serao examinadas ou concedidas porque nao tem autorizacao do CGEN