



Inovação Tecnológica em Saúde

O modelo de inovação do Instituto Butantan

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22 a 24 de outubro de 2012

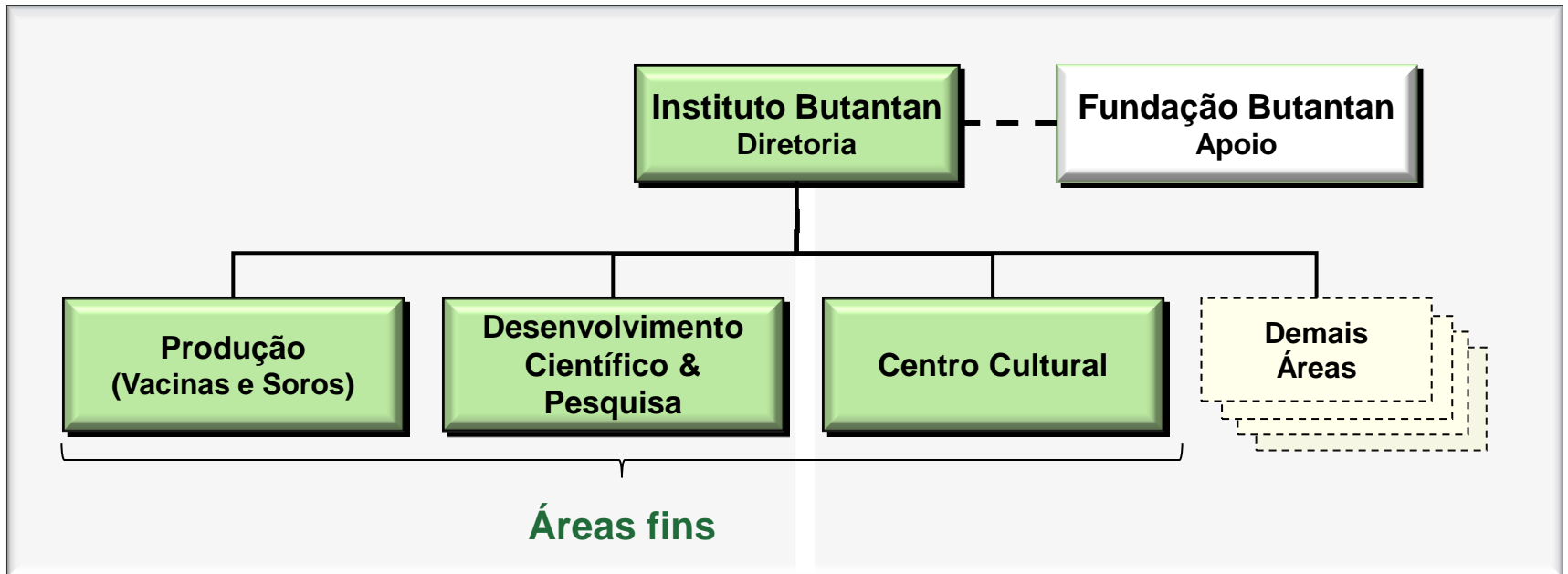
BUTANTAN – UMA INSTITUIÇÃO PÚBLICA DO GOVERNO DE ESTADO DE SÃO PAULO

- ❑ Em 1901 o Butantan foi fundado para produzir soros contra a peste bubônica
 - ✓ Vital Brazil, primeiro diretor, desenvolveu estudos e pesquisas contra picadas de cobras e antivenenos
- ❑ O Butantan é um dos principais produtores público de vacinas, antivenenos e antitoxinas da América Latina
 - ✓ Totalmente dedicado a desenvolver *pesquisas científicas* e a *produção de produtos* biológicos de valor agregado para a saúde pública



AREAS FINS DO INSTITUTO BUTANTAN

MACRO ESTRUTURA ORGANIZACIONAL



- ~ 1.700 Funcionários diretos
 - ✓ Funcionários Públicos ~770 (45%)
 - ✓ Funcionários Fundacionais ~932 (55%)
- ~ 100 funcionários terceirizados

COMPLEXO INDUSTRIAL



■ 7 Grandes Fábricas (Prédios)

- ✓ Vacinas anaeróbicas (tétano, botulínico e Purificação)
- ✓ Vacinas aeróbicas (Difteria e Pertussis)
- ✓ Hepatite
- ✓ Influenza
- ✓ Raiva
- ✓ Hemoderivados
- ✓ Controle, Soros e Formulação & Envase

■ 6 Plantas Pilotos

- ✓ Dengue / Rotavírus (Em Construção)
- ✓ Recombinantes (BCG)
- ✓ Monoclonais
- ✓ Influenza
- ✓ Hemoderivados

TRANSFERÊNCIA DE CONHECIMENTO PARA A SOCIEDADE

- 4 MUSEUS
- ~300 K visitantes/ano
- Parque com 80 hectares
- Área verde preservada



MUSEU HISTÓRICO



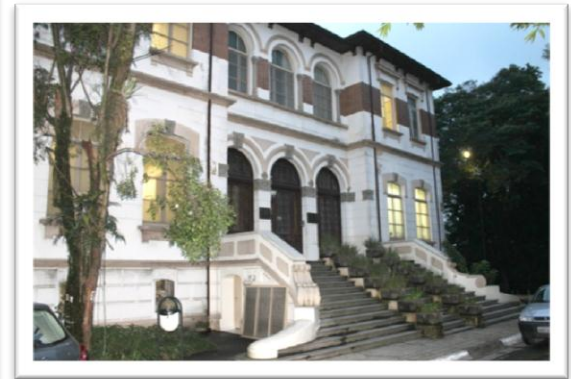
MUSEU DE MICROBIOLOGIA



MUSEU BIOLÓGICO

LABORATÓRIOS DE PESQUISA & DESENVOLVIMENTO

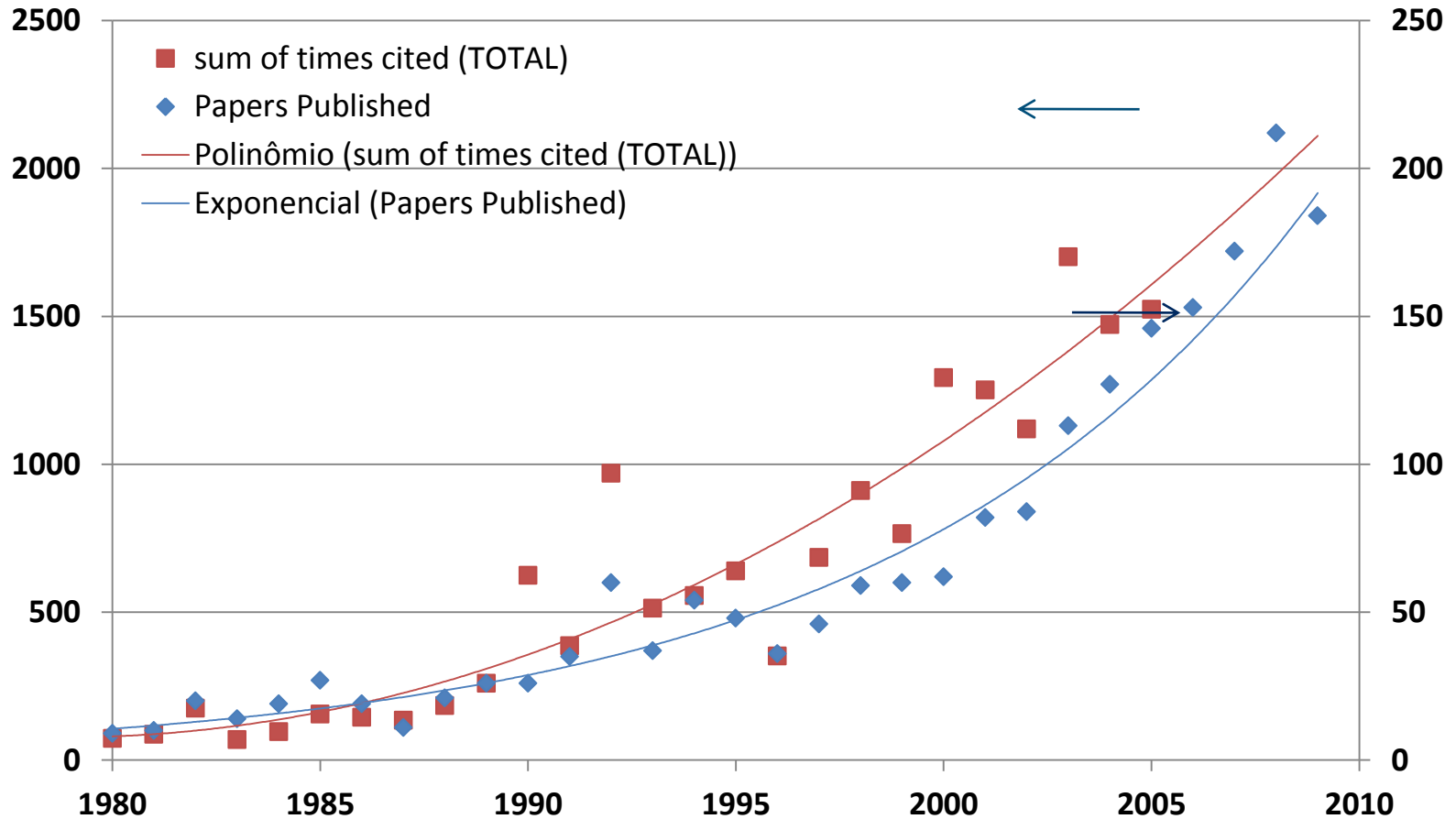
- ~21 laboratórios científicos
- ~180 Pesquisadores
 - ✓ 85% são doutores
- 1 Centro de Biotecnologia
 - ✓ Vários laboratórios
- 1 Hospital (10 leitos)
- 1 Biotério Central



- Programas de estágio (PAP)
- Pós-graduação em Toxinologia
 - ✓ Mestrado e doutorado

PUBLICAÇÕES CIENTÍFICAS INDEXADAS

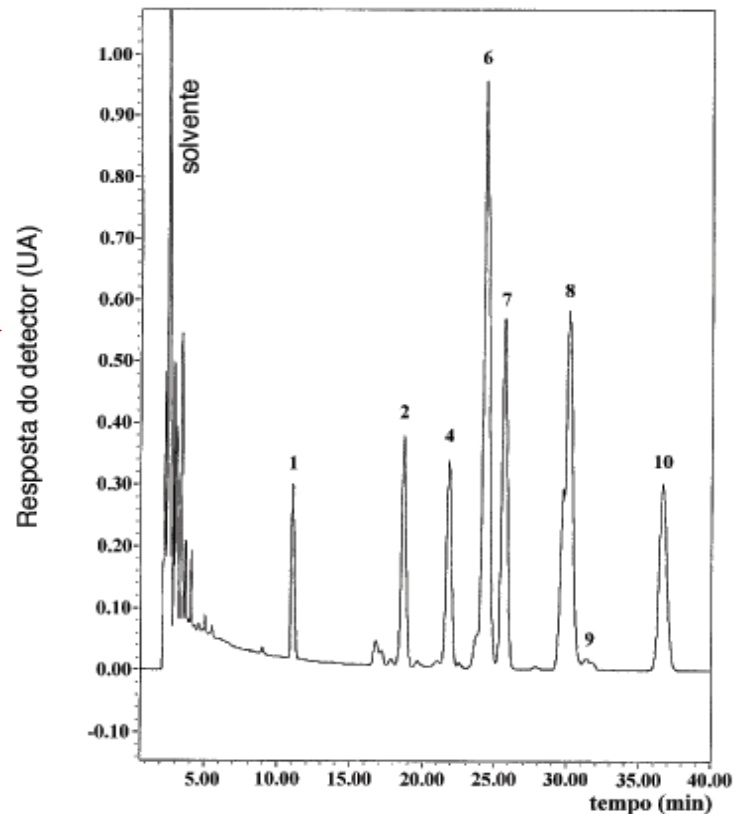
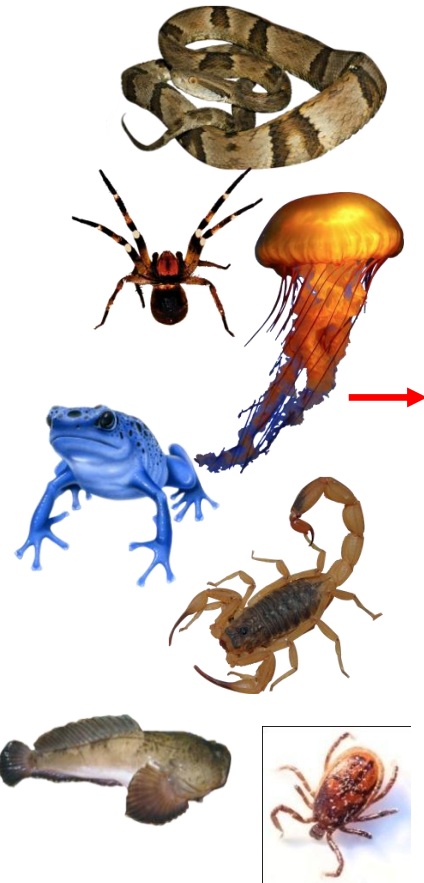
Publicações e Citações



TRIAGEM DE COMPONENTES BIOATIVOS DE ANIMAIS VENENOSOS

Composição de Venenos (Transcriptomics and Proteomics)

Atividades Farmacológicas



- ❑ ANALGÉSICOS
- ❑ ANTI-INFLAMATORIOS
- ❑ ANTIMICROBIOLÓGICOS
- ❑ ANTICOAGULANTES
- ❑ ANTITUMORAIS
- ❑ AÇÃO NO SISTEMA NERVOSO
- ❑ ANTIVENENOS
- ❑ ANTIHIPERTENSIVOS

Principais Projetos Instituto Butantan

Projects - Butantan (2012)

Nº	Project	Description	Phase	Partnership	Patent
1	Hemoderivatives	Production of IgG, factor VIII, IX, Albumine and other proteins	construction of the facility	GE	
2	Dengue vaccine	Tetravalent (sorotypes DEN1, DEN2, DEN3, DEN4) with attenuated virus	phase II	NIH/DVI/BNDES/FAPESP	
3	Rotavirus vaccine	Pentavalent (sorotypes G1, G2, G3, G4, G9) with attenuated virus	phase II	NIH/PATH/BNDES	
4	Pertussis low vaccine	B. pertussis whole cell with lower content of LPS	phase I	NIV	PI0402630-6 (2004)
5	Adjuvant BpMPLA	BpMPLA derived from LPS of B.pertussis and utilization as adjuvant in influenza vaccine	scale up		PI0721393-0 (2007)
6	Recombinant BCG-Pertussis	Vaccine for neonates and for bladder cancer treatment	GMP production	Hospital Oswaldo Cruz	PI0904468-0 (2009)
7	BCG-Pertussis + Hep B	Vaccine for neonates associated with Hepatitis B	GMP production		
8	Monoclonal Antibodies	Anti-human CD3	pilot production	InCor	

Principais Projetos Instituto Butantan

Projects - Butantan (2012)

Nº	Project	Description	Phase	Partnership	Patent
9	DTPlow-HepB-Hib (Pentavalent vaccine)	Pentavalent vaccine for the MoH	Scale up of conjugation process for Hib	Biomanguinhos	
10	DTPlow-HepB-Hib-IPV-MenC	Heptavalent vaccine for the MoH	análise de conjugação	Biomanguinhos	
11	Hepatitis B	Hepatitis B vaccine for > 50 years old and imunodefficiency people	phase IV		
12	Leptospira vaccine	Purified recombinant protein of Leptospira expressed in Escherichia coli strain	Identification of antigen		USPTO 60/360,566 (2002)
13	Lung surfactant	Industrial production of the surfactant	Licensed in Brazil (2009)	BR Foods	
14	Silica (SBA-15)	Immunogenic complex formed by vaccinal antigens encapsulated by nanostructured mesoporous silica (Adjuvant and vaccinal antigens)	Pre-clinical studies	FAPESP/Laboratórios Cristália	PI0503817-0(2005)
15	Amblyomin-X	Anti-cancer from Amblyomma cajennense	Scale up	FAPESP/União Química/BNDES	PI0406057-1(2004)/PCT/BR2008/000078
16	Crotalphine	Potent analgesic drugs from animal venoms and toxins. Long-lasting analgesic action (2-5 days)	Research	FAPESP/Biosintética Farmacêutica	PCT/BR 2005/000073

Principais Projetos Instituto Butantan

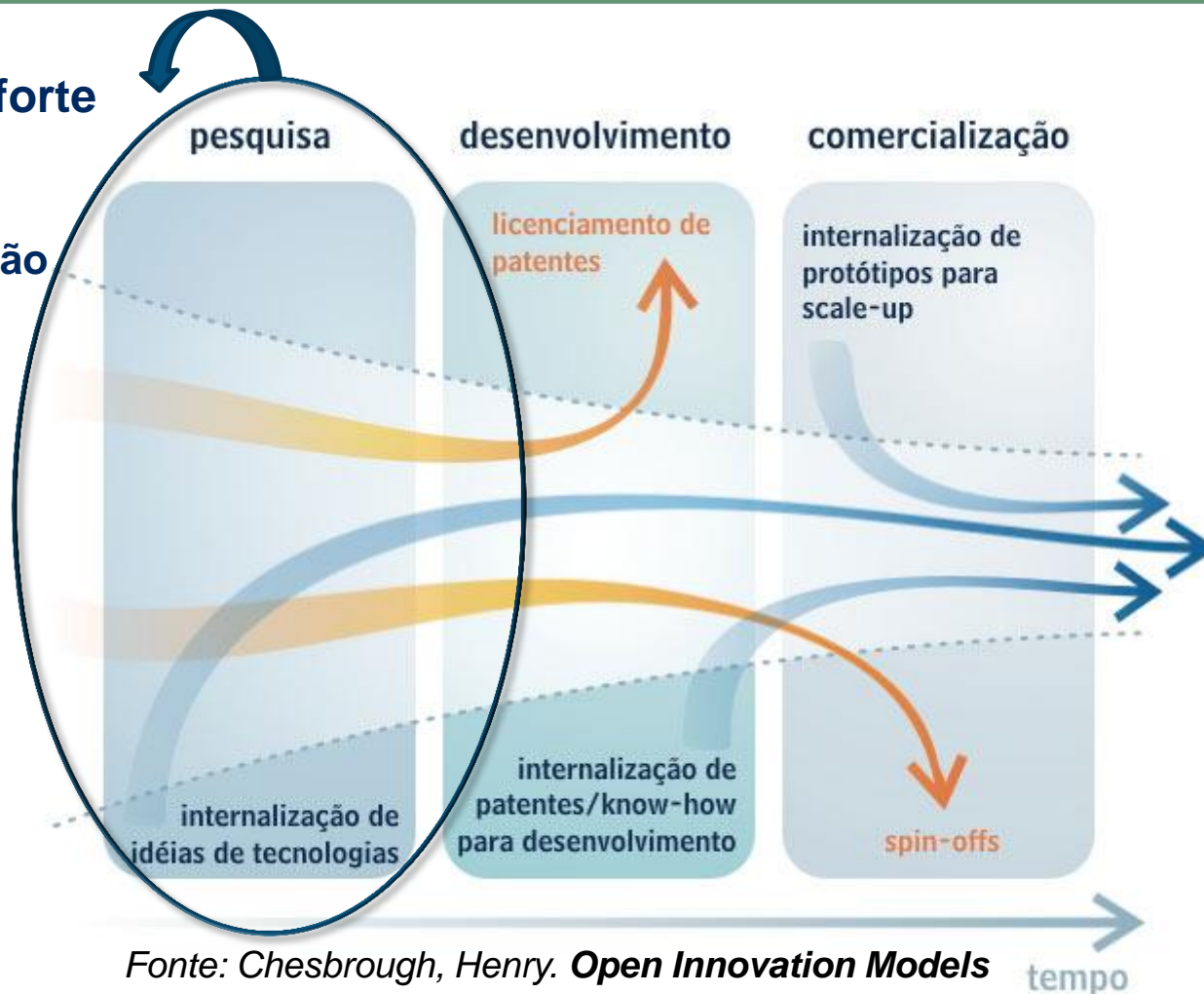
Projects - Butantan (2012)

Nº	Project	Description	Phase	Partnership	Patent
17	Lopap	Soluble proteins from <i>Lonomia obliqua</i> : Prothombin Activator	Research		PI0200269-8 (2002)
		Recombinant molecule and its use as defibrinogenating/antithrombotic agent	Research		PCT/BR2005/000171
		Anti-apoptotic activity and pharmaceutical formulations	Research	FAPESP/Biolab Sanus Farmacêutica	PI0504199-6 (2005)
		Peptides capable of stimulating production of extracellular matrix (ECM) proteins in cells (e.g., fibroblasts), and hence can be utilized as a generating agent for tissue and skin, as well as utilized as a cosmetic.	Research	FAPESP/Biolab Sanus Farmacêutica	USPTO61/022,747 (2008)
18	Haemophilus influenzae b	Innovative conjugation method for the polysaccharide antigen and the carrier protein resulting in higher yield.	Research	Butantan	
19	Crotamine	Treatment of dysfunctions based on its property of interaction with genetic materials, such as DNA and RNA, and its celular selectivity	Research	Butantan	PI0501037-3 (2005)
20	Pneumococcal	Inactivated non-encapsulated pneumococcal whole cell	phase I	Harvard/PATH	
21	Necator Schistosoma	Cloning, expression and purification of recombinant proteins from E.coli and Yeast	Research	Sabin Vaccine/George Washington University	
22	Bee's antivenom	Bee's antivenom	Research		PI0804652-2 (2008)
23	Canine's Leishimaniose	Vaccine against leishimaniose for use in dogs	pilot production	UFMG	

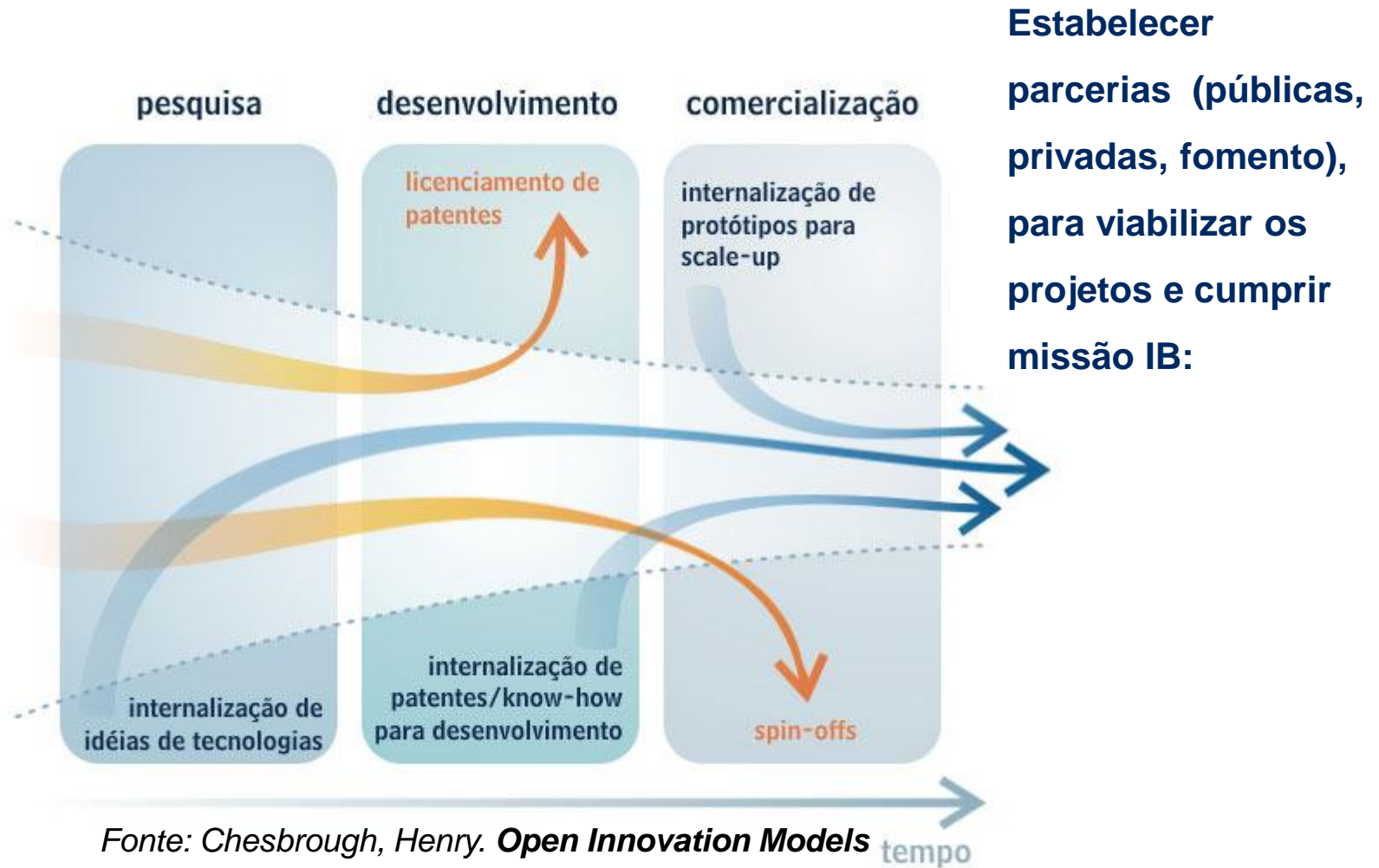
Modelo Inovação Instituto Butantan

O ponto forte do IB!

• Incorporação cultura pesquisa aplicada

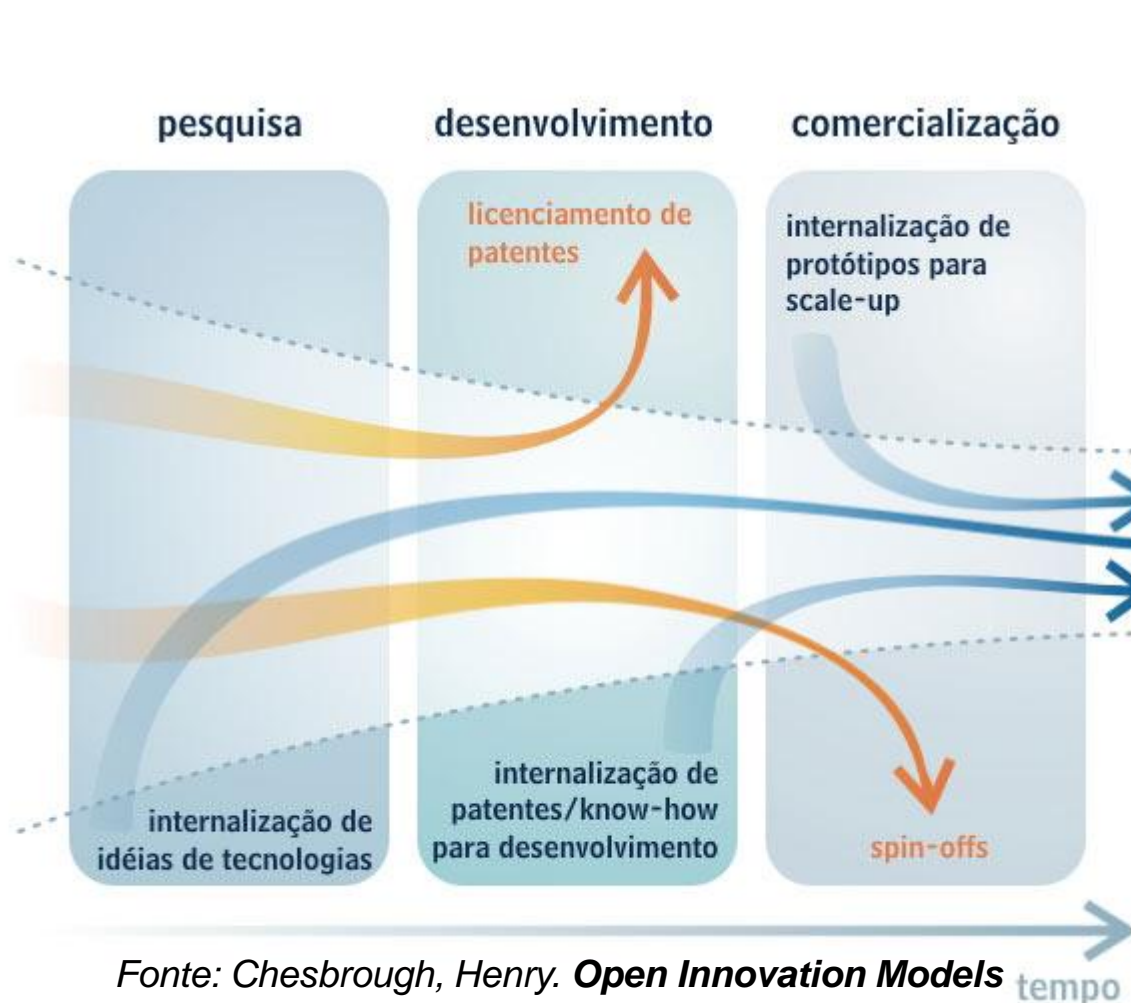


Modelo Inovação Instituto Butantan



Desenvolver pesquisas e produtos que contribuam para o acesso à saúde, compartilhando conhecimento com a sociedade

Modelo Inovação Instituto Butantan



Estabelecer parcerias (públicas, privadas, fomento), para viabilizar os projetos e cumprir missão IB:

- Incorporação tecnologia (Influenza – Sanoffi Pasteur), com proposta melhoria (MPLA);
- Licenciamento tecnologias (em andamento).

Implantação NIT IB

- **Importância implantação NIT, publicação Resolução SS-53, de 10/05/12;**
- **Órgão que fará a gestão da inovação da Instituição;**
- **Garantirá que estes processos aconteçam.**

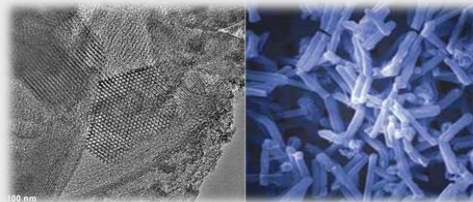
Patents

PATENTS BY SUBJECT	
SUBJECT	Nº
VACCINES	12
SERUMS	3
AMBLYOMMA CAJENNENSE	2
LOPAP	3
CROTAMINE	1
MAB	1
LEPTOSPIRA	10
ANALGESIC COMPOUNDS	1
ANTIBACTERIAL AS ANTI-CONVULSIVANT	1
IMMUNOTHERAPEUTIC	2
PEPTIDES	4
STEM CELLS	2
OTHERS	10
TOTAL	52

IMMUNOGENIC COMPLEX FORMED BY VACCINAL ANTIGENS ENCAPSULATED BY NANOSTRUCTURED MESOPOROUS SILICA

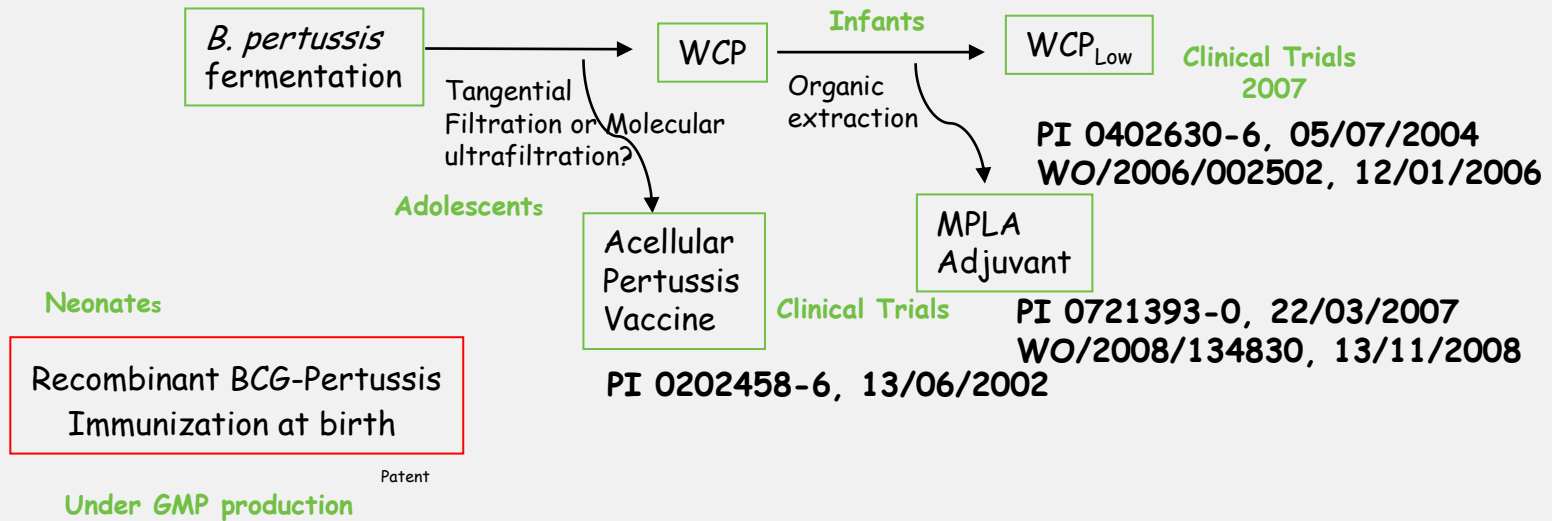
PI 0503817-0, 12/09/2005

- Adjuvant (solid particles of highly ordered nanostructured mesoporous silica) and **vaccinal** antigens;
- Presentation of the antigens in a safe, gradual and **prolonged** manner;
- Immunological memory more efficient;
- Increase of the immunogenicity of the antigen;
- Improvement in antibody production;
- Immune protection efficiently with lower amounts of antigens or less repeats;



PROCESS FOR OBTENTION OF NEW CELLULAR PERTUSSIS VACCINE

- Less toxic;
- As potent as



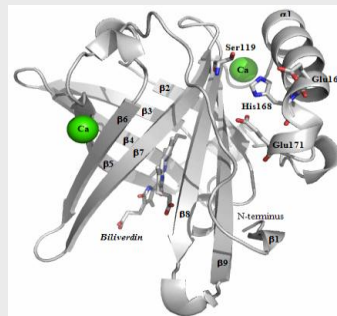
RECOMBINANT PROTEASE PROTHROMBIN ACTIVATOR (LOPAP)

PI 0200269-8, 31/01/2002

PI 0403882-7, 24/08/2004

PI 0504199-6, 08/09/2005

- Prothrombin activator;
- Defibrinogenating/antithrombotic agent;
- Kit for diagnosis of dysprothrombinemias;
- Anti-apoptotic activity.



Lonomia obliqua

FAPESP, BIOLAB SANUS FARMACÊUTICA

KUNITZ-TYPE RECOMBINANT INHIBITOR, AMBLYOMIN – X, OBTAINED FROM SALIVARY GLANDS OF THE AMBLYOMMA CAJENNENSE

PI 0406057-1, 15/09/2004

WO/2008/109976, 18/09/2008

- Anticoagulant activity;
- Apoptotic activity in tumor cells;
- Anti-metastatic activity of melanoma tumor;
- Anti-cancer activity;
- Utilization of the recombinant in different hemostatic mechanisms.



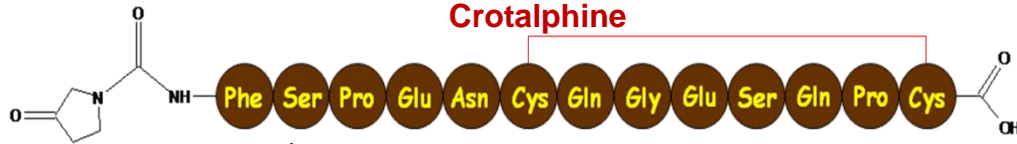
Amblyomma cajennense

FAESP, UNIÃO QUÍMICA FARMACÊUTICA

PATENTS

Crotalphine

Potent analgesic drugs from animal venoms and toxins



Venom of



Crotalus

**Potent analgesic
long-lasting analgesic action
(2-5 days)**

**Recent studies show involvement of PKC ζ
which activates MAPKs
(Mechanism that may contribute to its long-lasting
analgesic action)**

Molecular mechanisms involved in the analgesic action

Activation of CB2 cannabinoid
receptors



release of
endogenous
opioids

Activation of peripheral κ and δ
opioid receptors



intracellular
signaling
pathways
activation

Activation of NO-cGMP-PKG
and opening of potassium
channels

USE OF CROTAMINE, KIT AND COMPOSITION

PI 0501037-3, 18/03/2005

WO/2006/096953, 21/09/2006

- Interaction with genetic material;
- Transport of molecules to the surface, cytoplasm or cell nucleus;
- Selective cell penetration;
- Use for the treatment of diseases and dysfunctions.

OBRIGADO!



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