

Exposome, genetics and disease: Southern Brazil as a model

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EXPOGEN-CANCER CNRS International Research Project

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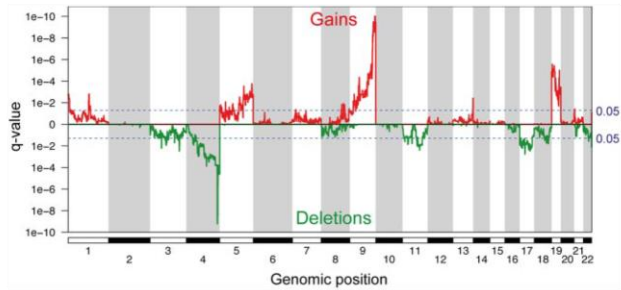
St. Jude Children's Research Hospital – Memphis TN, USA



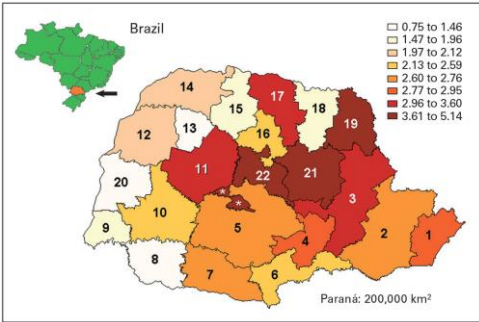
The French partner:
 « Mechanisms of gene expression
 regulation in physiopathology » team,
 IPMC
 Valbonne



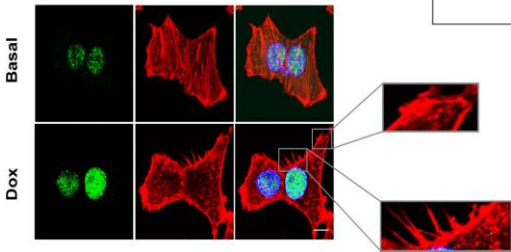
Genomics



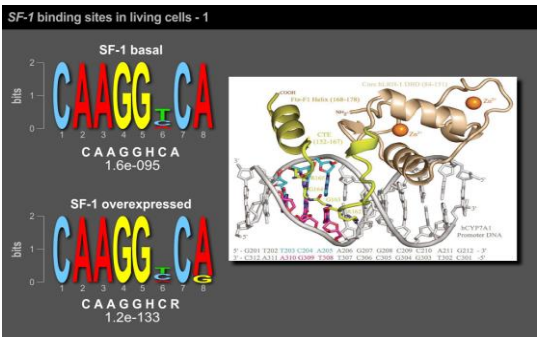
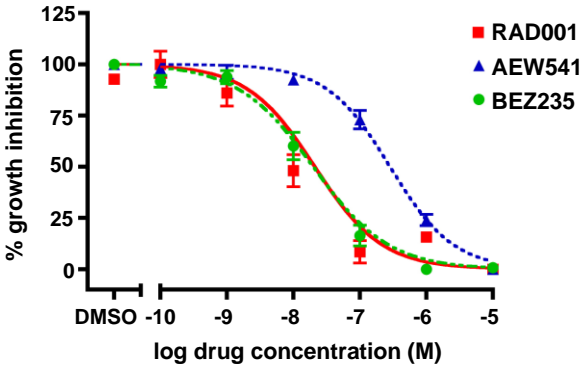
Epidemiology



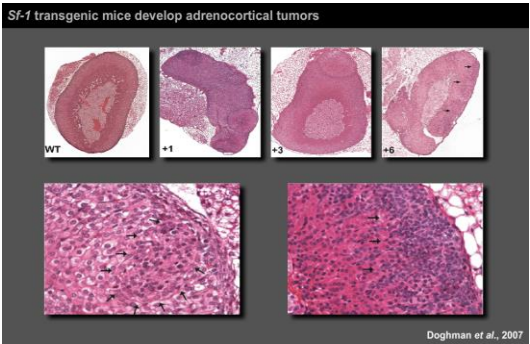
Cell biology



Pharmacology



Animal
models



ipmc

With the inspiration of Antoine de Saint-Exupéry...



The Brazilian partner: Hospital Pequeno Príncipe Curitiba PR



Hospital Pequeno Príncipe

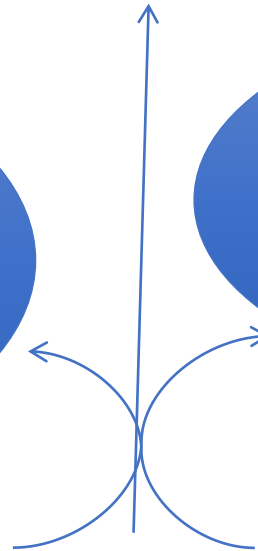
The largest paediatric hospital in Brazil
(Curitiba, Paraná)

Faculdades Pequeno Príncipe

Medicine, psychology,
biomedicine, pharmacy
and nursery school

Instituto de Pesquisa Pelé Pequeno Príncipe

Increase the cure rate
of lethal diseases in
children



The US partner:

St. Jude Children's Research Hospital

Memphis TN



St. Jude is leading the way the world understands, treats and defeats childhood cancer and other life-threatening diseases.

The mission of St. Jude Children's Research Hospital is to advance cures, and means of prevention, for paediatric catastrophic diseases through research and treatment.

Consistent with the vision of the founder Danny Thomas, no child is denied treatment based on race, religion or a family's ability to pay for healthcare.

History of our collaboration

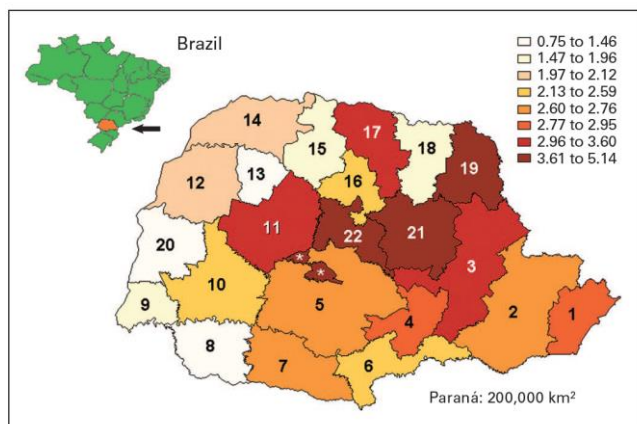
- 2003 – 2006 CAPES-COFECUB
- 2007 – 2009 PICS CNRS
Project ARCUS MAE – Région PACA
- 2011 – 2018 LIA CNRS *NEOGENEX*
- 2014 – 2016 Project Ciência sem Fronteiras CAPES -
CNPq
- 2019 – 2023 IRP CNRS *EXPOGEN-CANCER*

Some figures

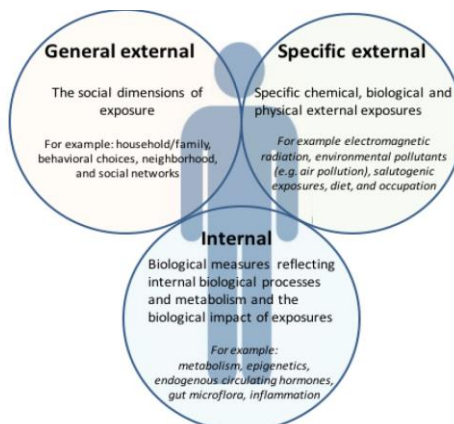
- 23 common publications - *one of them received the annual prize of the Brazilian health magazine Saúde for the field of Paediatrics (2013)*
- 25 communications to international meetings
- 5 co-organized international meetings
- 6 exchanges of PhD students (“doutorado sanduíche”) and post-docs

Relationship between the exposome, cancer and other diseases taking the State of Paraná, Brazil as a model: an integrated approach

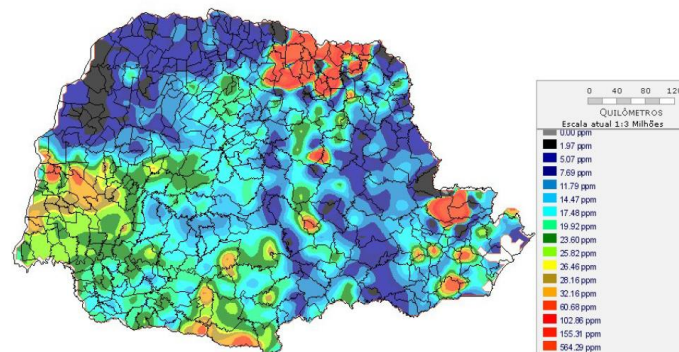
- Very high prevalence in this geographic region of the *TP53* p.R337H mutation, which predisposes to multiple types of cancer, but with low penetrance. Ongoing studies are investigating the genetic determinants that synergize with this mutation to influence development of different types of cancer
- Important problems of contamination by environmental pollutants and toxic substances (pesticides, heavy metals *etc.*), especially in the Northern regions of Paraná, which have intensive agricultural activities
- Development of Geographical Information Systems (GIS) for environmental data - disease distribution correlation: <http://geomedicina.org.br>



Map of *TP53* p.R337H prevalence through neonatal screening



The exposome



Map of chemical pollutants

Perspectives

- The peculiar epidemiological situation in Southern Brazil offers a unique opportunity to assess the influence of genetic and environmental factors on health, and especially on cancer, for a risk population of about 100 million people. Our integrated, interdisciplinary program aims to improve health and well-being of the population in the Brazilian State of Paraná (approx 1/3 of France). We believe that the methods used and the results obtained in this model system could be extrapolated to and implemented in other geographical areas, in Europe and elsewhere.