Simpósio Internacional Integração Corpo-Mente-Meio

EPIGENETICS

FAPESP
Simpósio Internacional Integração Corpo-Mente-Meio
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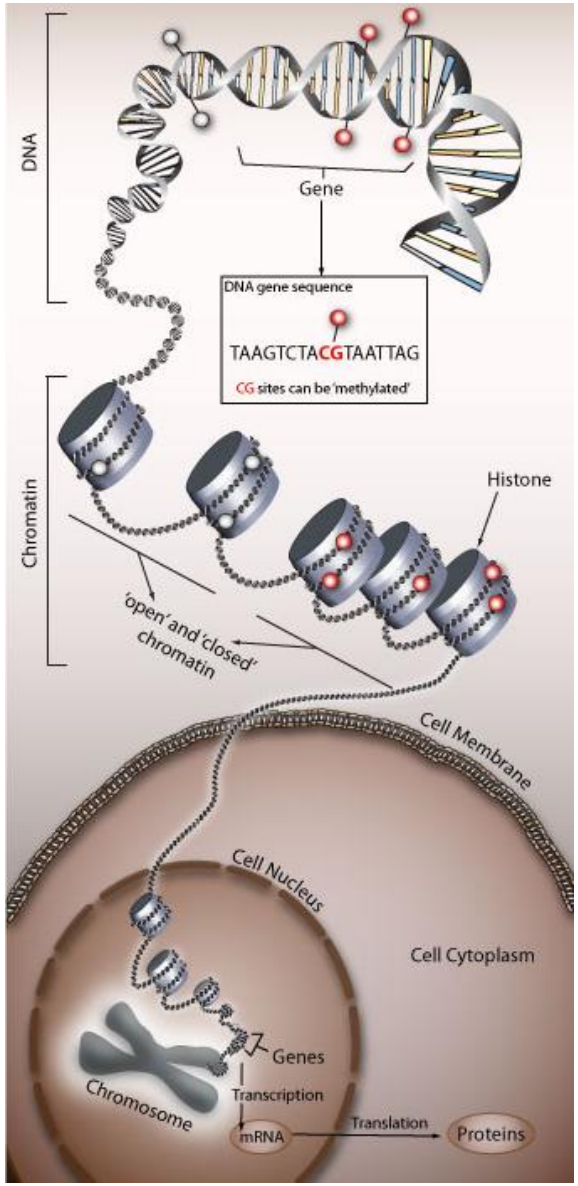
EPIGENETICS

Definition

- **“Heritable changes in gene expression not attributable to nucleotide sequence variation”**

Murrell *et al*., 2005

Epigenetic marks



DNA methylation

+

Histone modifications

Alterations in chromatin structure

Gene expression regulation

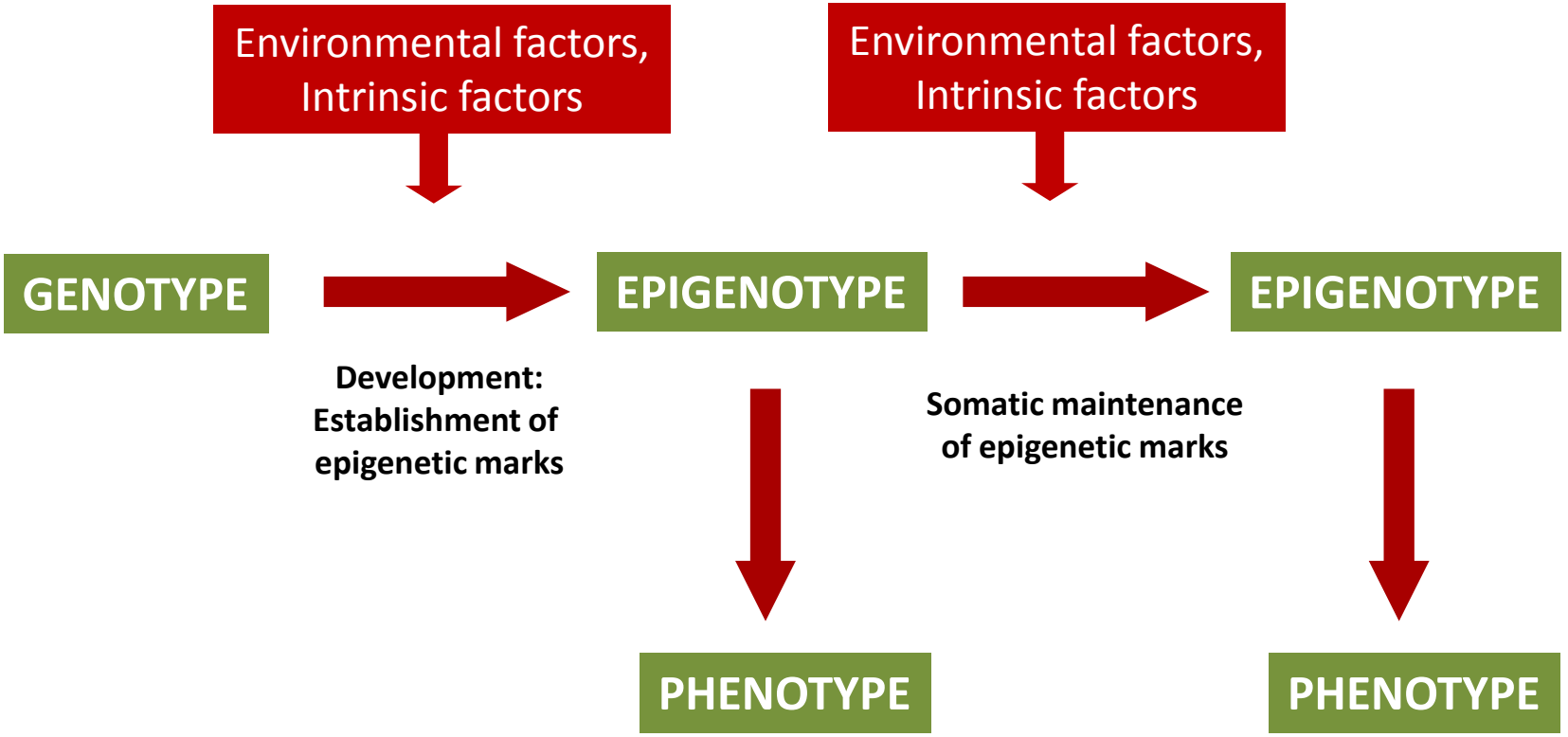
EPIGENETICS

Gene expression patterns

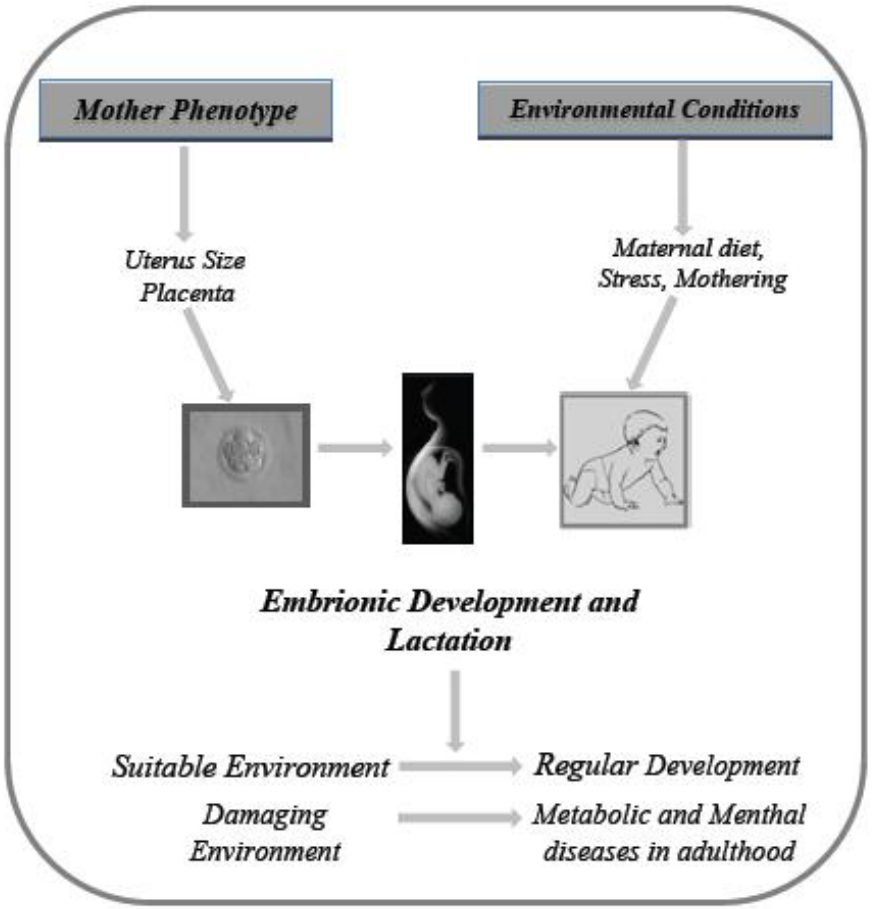
- **Specific**
- **Mitotically heritable**
- **Reversible**
- **Suscetible to environment influence** (diet, inflammation, drugs...)

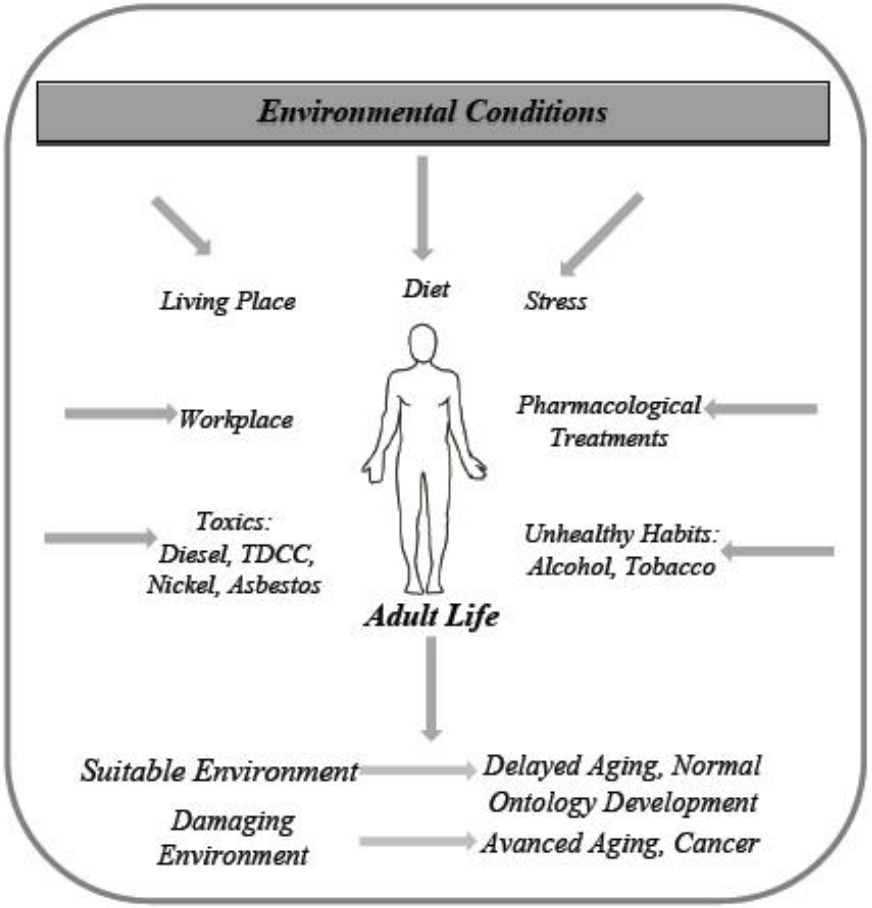
The epigenome permits that the genome "talks" with environment

Effects of environment factors on epigenetics



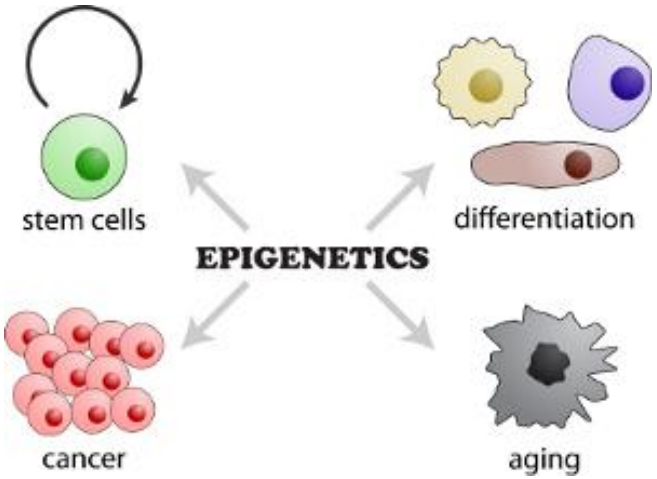
Effects of environment factors on epigenetics





Rodríguez-Rodero *et al.*, 2010

EPIGENETICS



Physiological processes

- Embryonic development
- Differentiation
- Genomic imprinting
- X chromosome inactivation
- Memory establishment

Pathological conditions

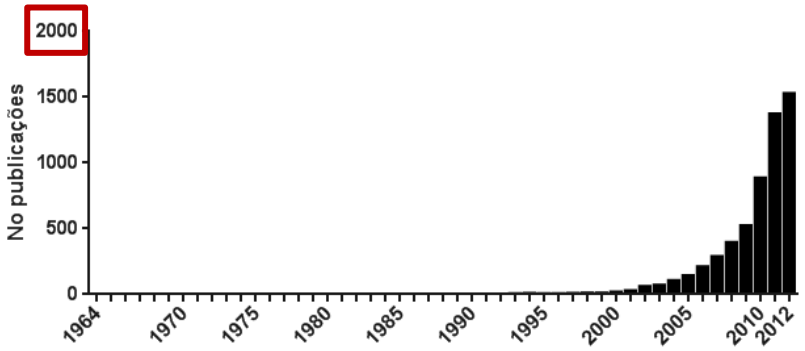
- Aging
- Neurological disorders
- Autoimmunity
- Obesity
- **Cancer**

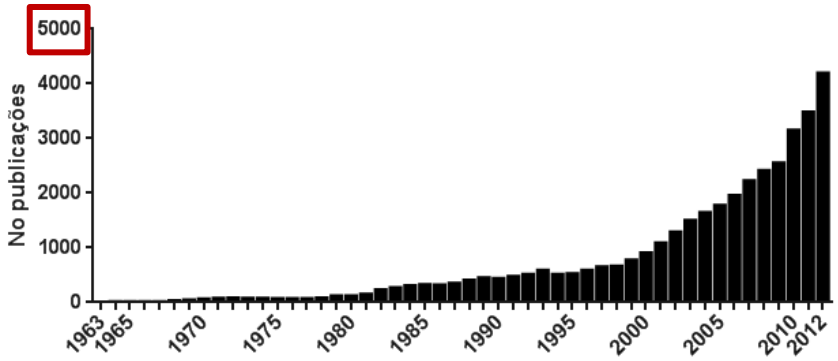
SCIENTIFIC ARTICLES

Epigenetics

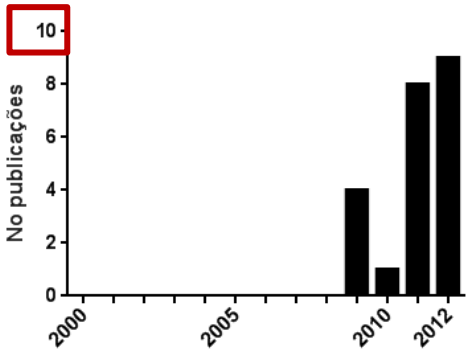
DNA methylation

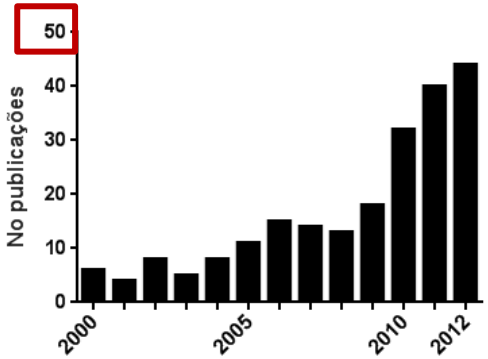
WORLDWIDE





BRAZIL



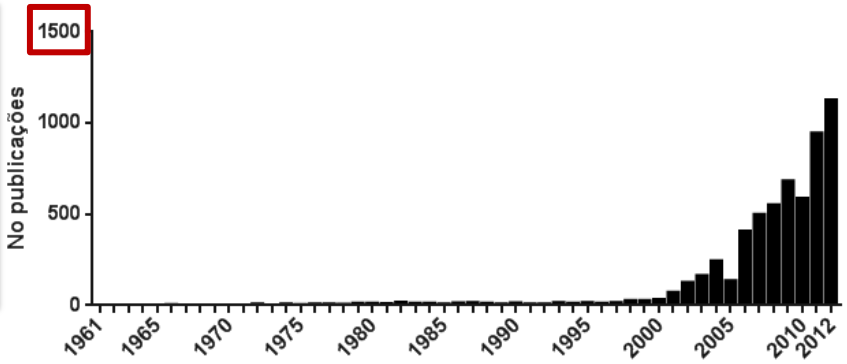


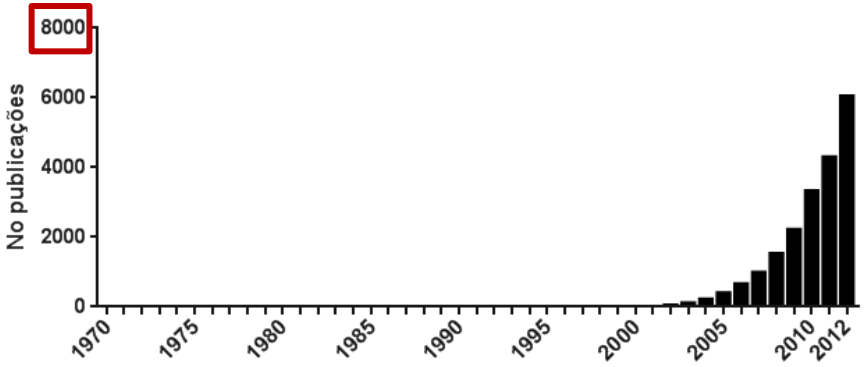
SCIENTIFIC ARTICLES

Histone modifications

miRNA

WORLDWIDE





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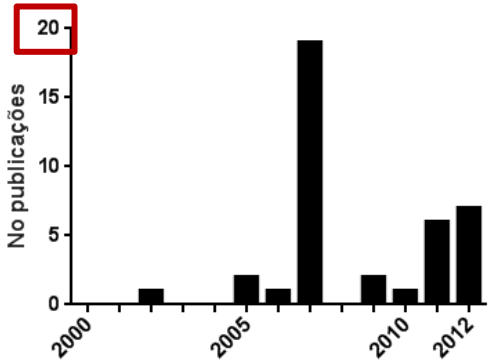
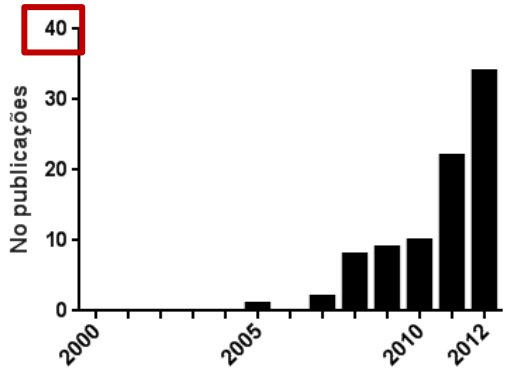




Research in epigenetics field

Brazil

1º. **Epigenetics and Cancer** (mainly tumor biomarkers)

São Paulo	UNIFESP Ludwig Institute for Cancer Research Hospital A.C. Camargo UNESP Botucatu UNESP São José do Rio Preto USP Ribeirão Preto
Rio de Janeiro	INCA UFRJ
Other	UFPR UFES UFRS UFPA

Research in epigenetics field

Brazil

2º. **Epigenetics and Neuroscience**

(memory, neurological disorders, depression..)

Rio Grande do Sul	Universidade Católica do RS UFRS
Rio de Janeiro	UFRJ
São Paulo	USP Ribeirão Preto

Research in epigenetics field

Brazil

3º. Epigenetics and nutrition

São Paulo — USP

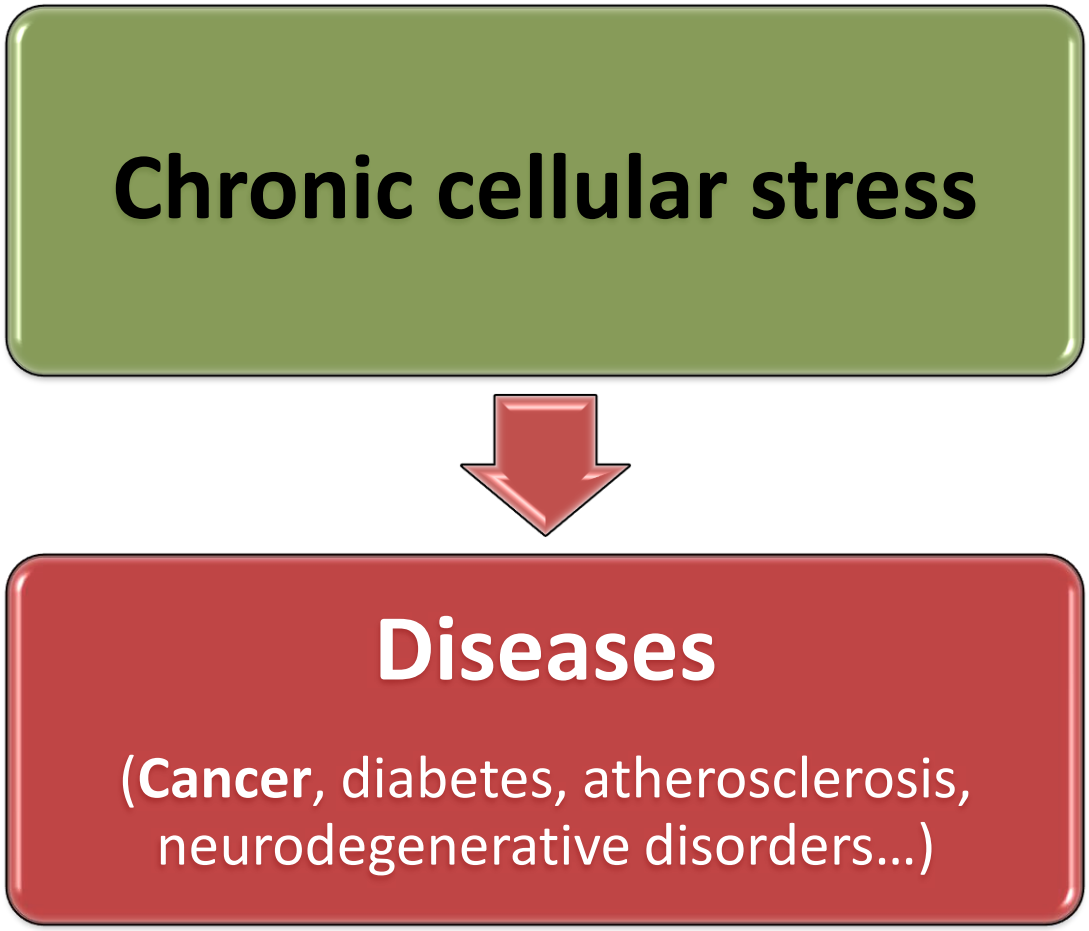
4º. Epigenetics and development

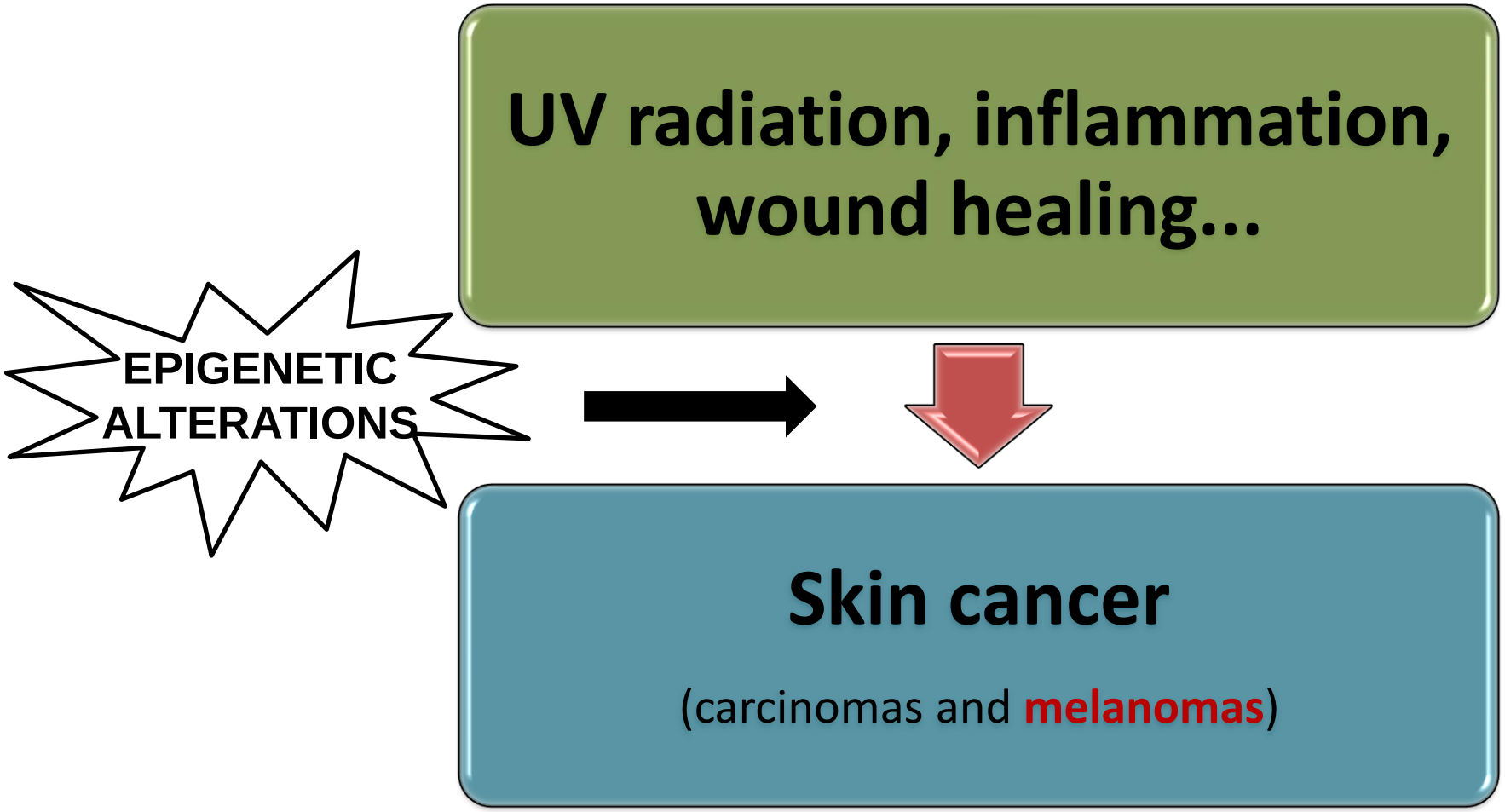
(X chromosome inactivation, imprinting)

São Paulo — USP
USP Ribeirão Preto
UNESP Botucatu

Epigenetics: Linking sustained stress and malignant transformation

Miriam G. Jasiulionis & Cia


Chronic cellular stress
Diseases
(Cancer, diabetes, atherosclerosis, neurodegenerative disorders…)


UV radiation, inflammation, wound healing...
EPIGENETIC ALTERATIONS
Skin cancer
(carcinomas and melanomas)

Spreading our knowledge about Epigenetics

I Encontro Nacional de Epigenética – da saúde à doença

UNIFESP, Junho de **2008**
Coordenação: Dra. Vânia D'Almeida e Dra. Miriam G. Jasiulionis

II Encontro Nacional de Epigenética – epigenética básica e aplicada

Hospital Alemão Oswaldo Cruz, Março de **2010**
Coordenação: Dra. Mariangela Correa e Dra. Miriam G. Jasiulionis

II Encontro Nacional de Epigenética

Hospital Alemão Oswaldo Cruz, Maio de **2011**
Coordenação: Dra. Mariangela Correa e Dra. Miriam G. Jasiulionis

II Encontro Nacional de Epigenética

UNIFESP, Novembro de **2012**
Coordenação: Dra. Mariangela Correa e Dra. Miriam G. Jasiulionis

Challenges

Methodological challenges

Provide opportunities to learn more about epigenetics and methodological approaches used to evaluate epigenetic marks

Core facilities (next-generation sequencing, pyrosequencing, ChIP-seq, HPLC – mass spectroscopy, bioinformatics…)

Collaborative networks

Networks

- Epigenome Network of Excellence (NoE)
- Human Epigenome Atlas
- ENCODE/NIH Roadmap Epigenomics Consortium
- International Human Epigenome Consortium

PERSPECTIVES

“Epigenetic marks can be described as marks of experience; they contribute to differentiating us from our younger selves”

Jones & Martienssen, 2005