

Epigenetics in Paediatrics

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Introduction

What is epigenetics?

- ▶ Epigenetics is a new aspect in Genetics
- ▶ It opens a new window in medical treatments, preventions and public health
- ▶ Epigenetics tells a new story in gene regulation

What is epigenetics?...

- ▶ In other words it is a turn on and off key for gene expression
- ▶ Epigenetics is the key mediator between our environment and our genome
- ▶ Here I will briefly summarise its role in some paediatrics topics including: stress, obesity, diabetes, cancer and autism.

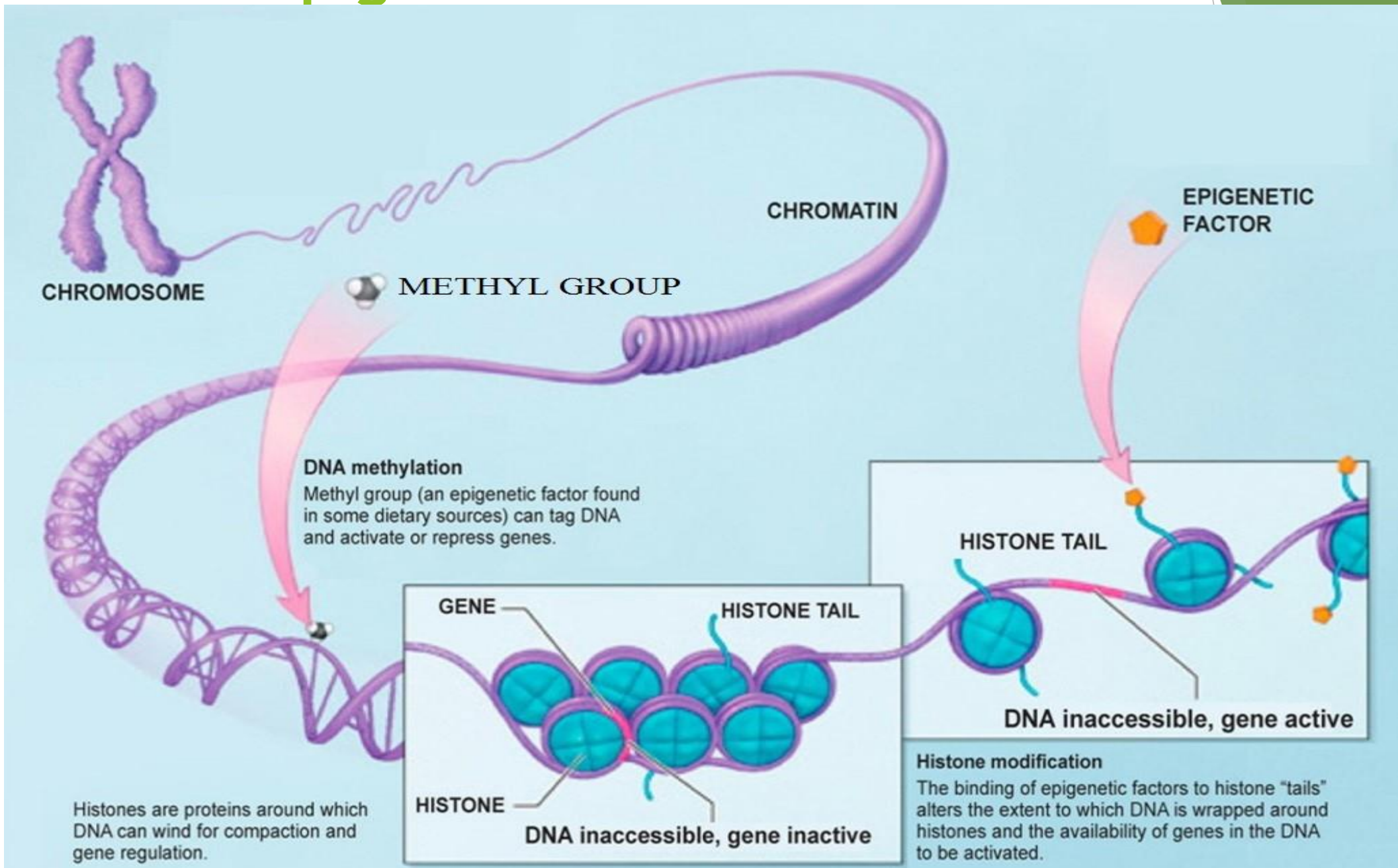
Epigenetics Mechanisms

- ▶ **Development (in utero, childhood)**
- ▶ **Environmental chemicals**
- ▶ **Drugs**
- ▶ **Aging**
- ▶ **Diet**

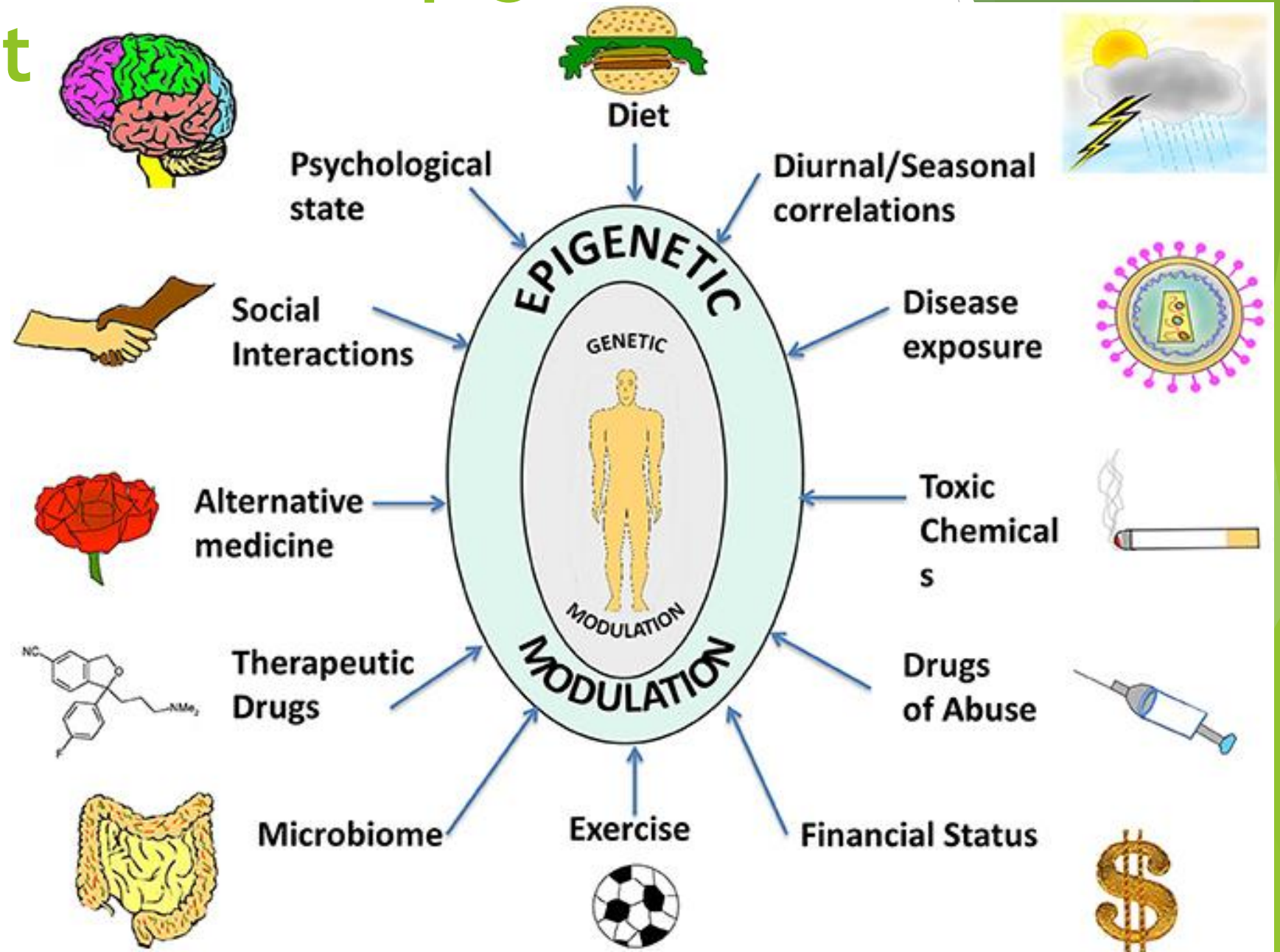
Health Endpoints

- ▶ **Cancer**
- ▶ **Autoimmune disease**
- ▶ **Mental Disorders**
- ▶ **Diabetes**

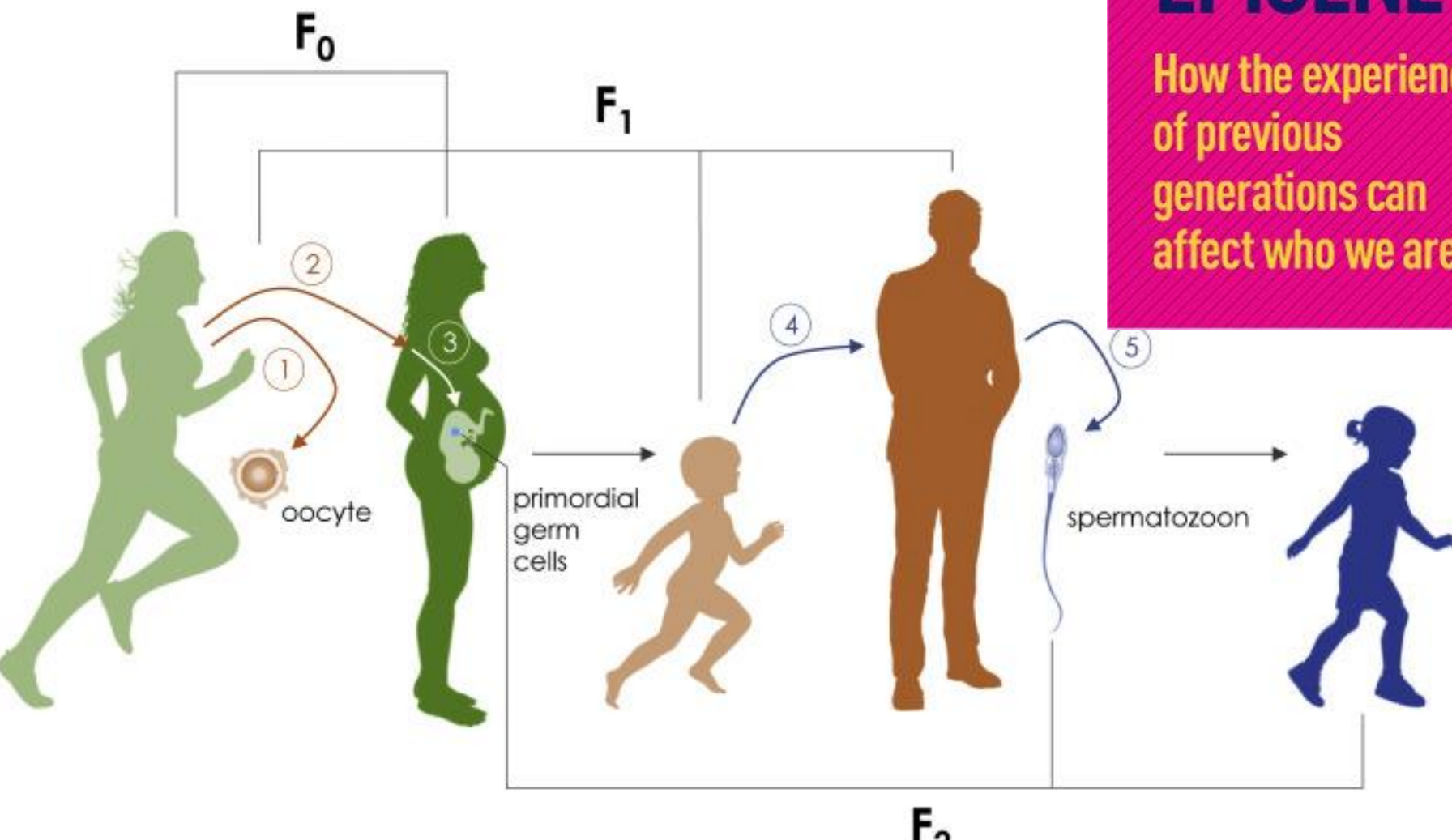
What is Epigenetics?



The main mediator in epigenetics is the environment



Genes transfer our ancestor's phenotype while epigenetics transfer their experiences to us

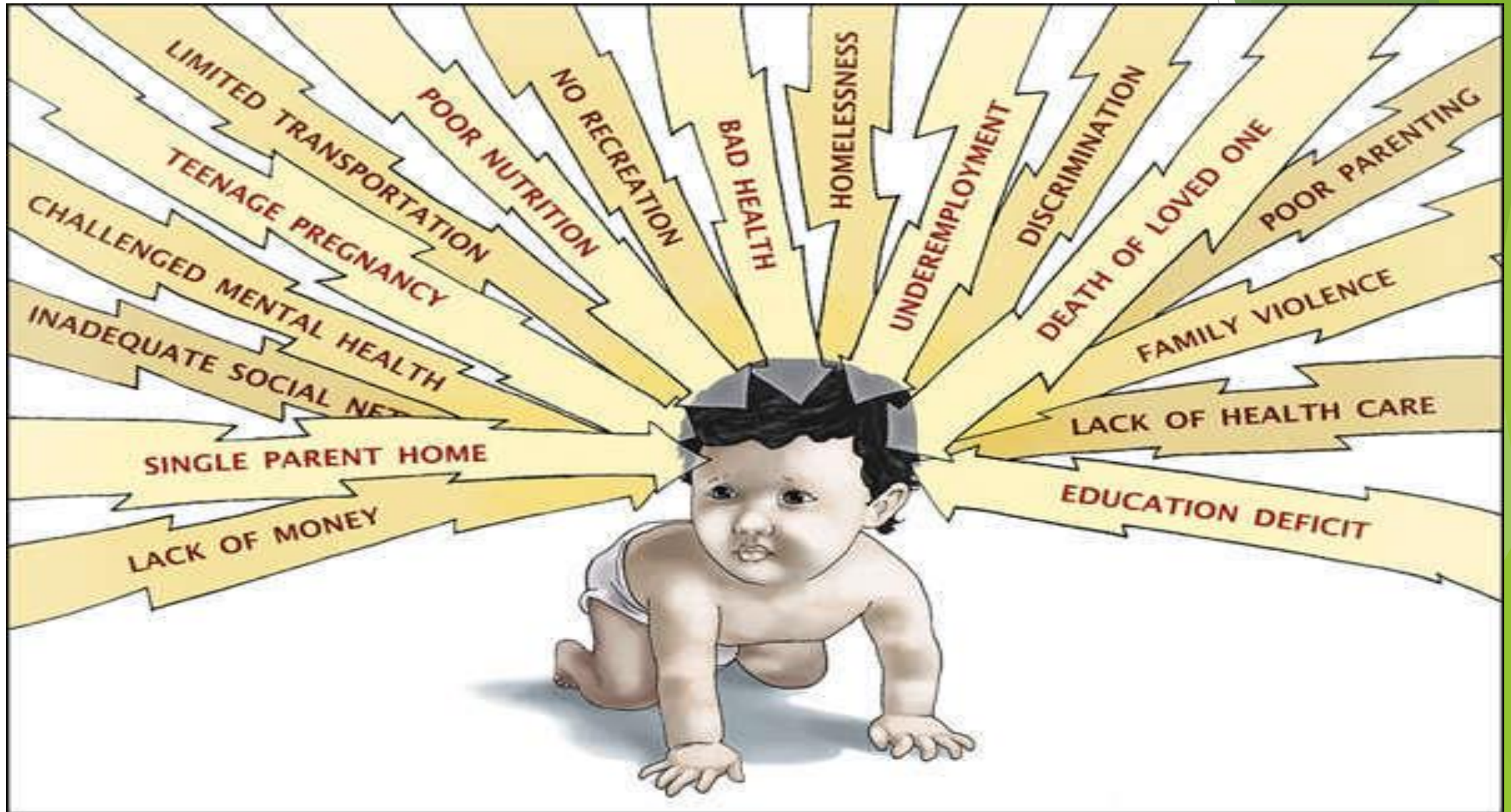


EPIGENETICS

How the experiences of previous generations can affect who we are

The illustration shows three generations of women. On the left is an elderly woman with white hair, wearing a purple dress and using a cane. In the middle is a middle-aged woman with dark hair, wearing a purple dress. On the right is a young girl with dark hair, wearing a blue dress and holding a yellow balloon. They are standing together on a pink background with a diagonal line pattern.

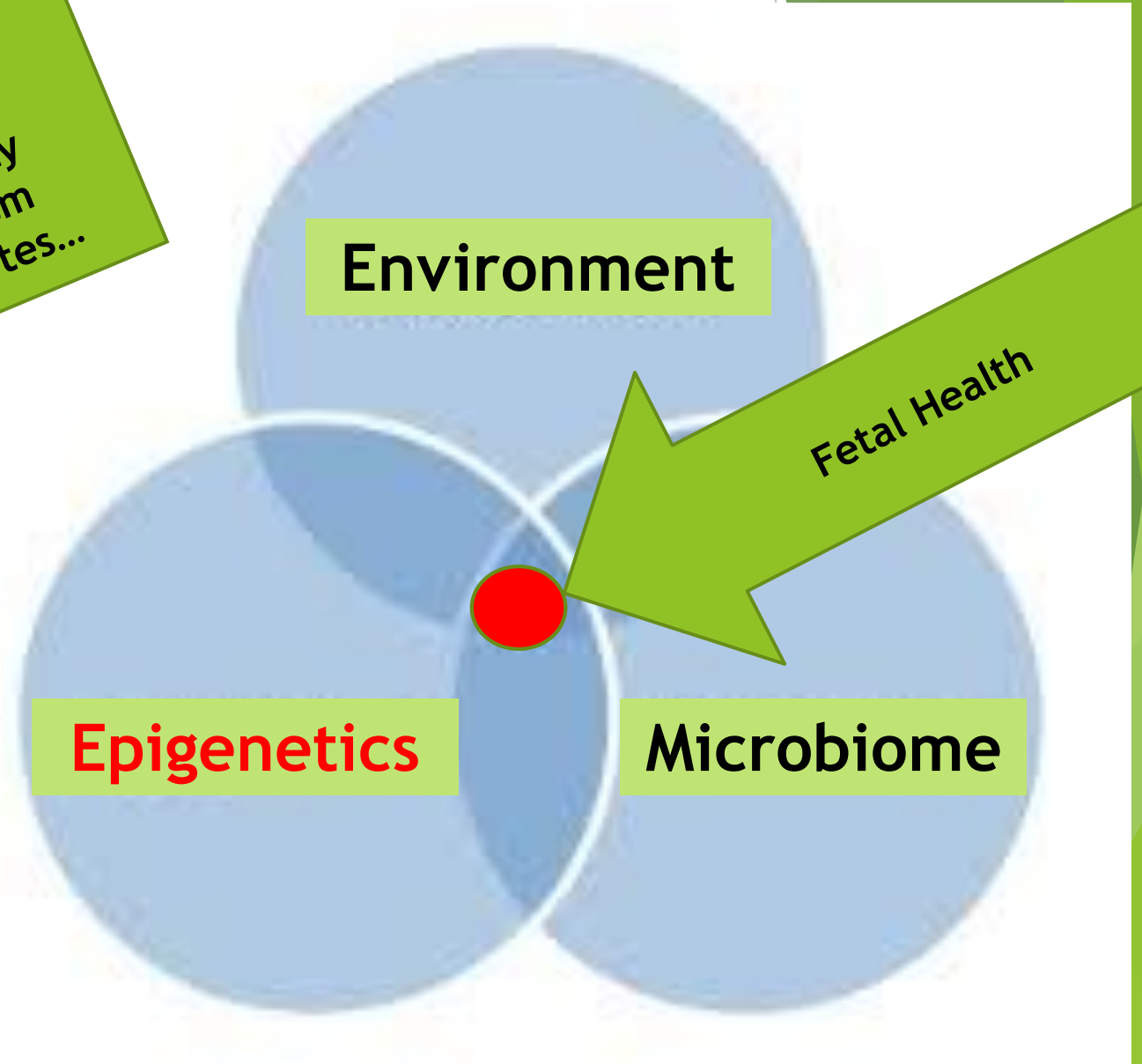
Stress load can modify Gene expression





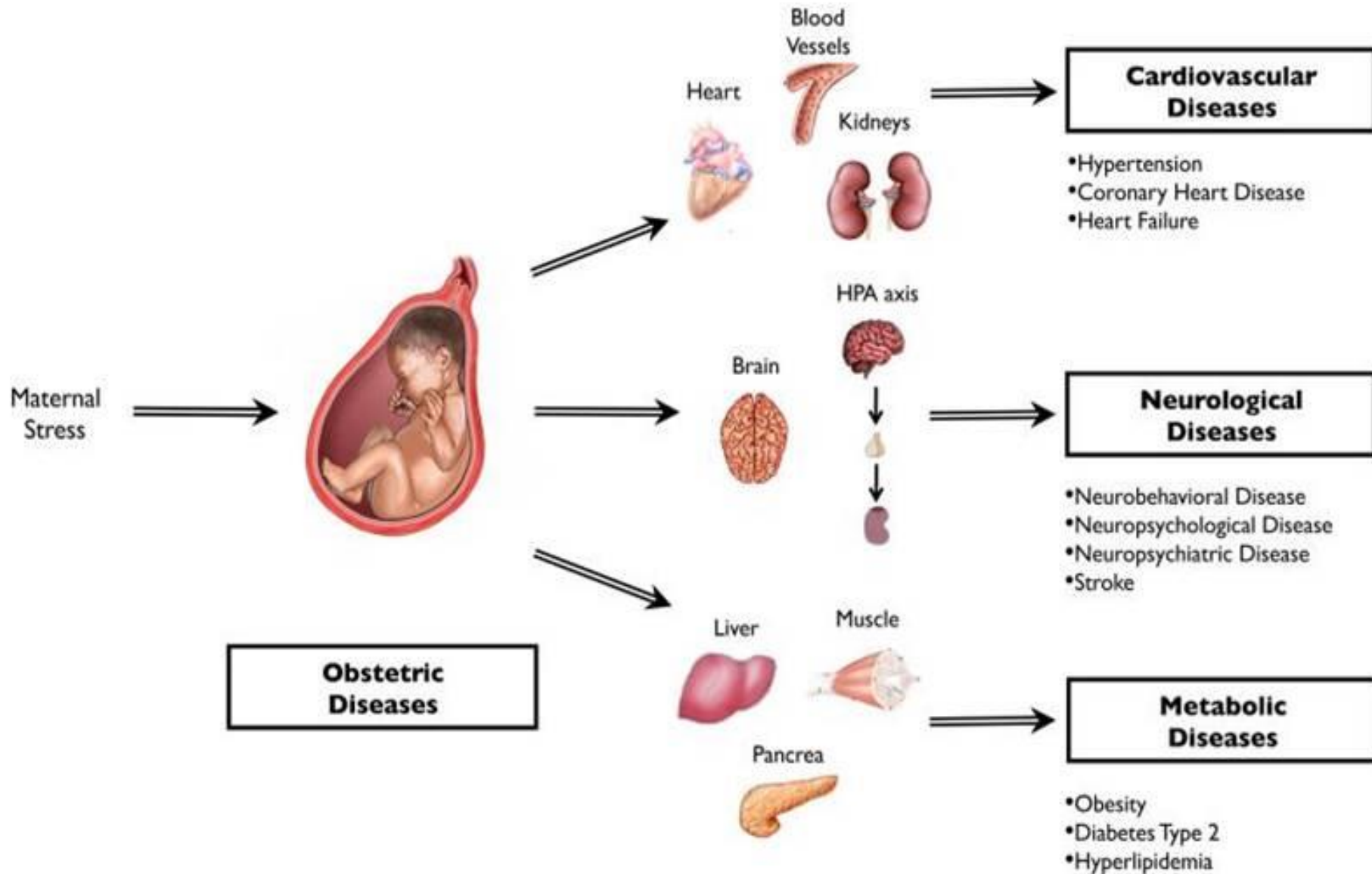
Mother - 1st generation
Fetus - 2nd generation
Reproductive cells - 3rd generation

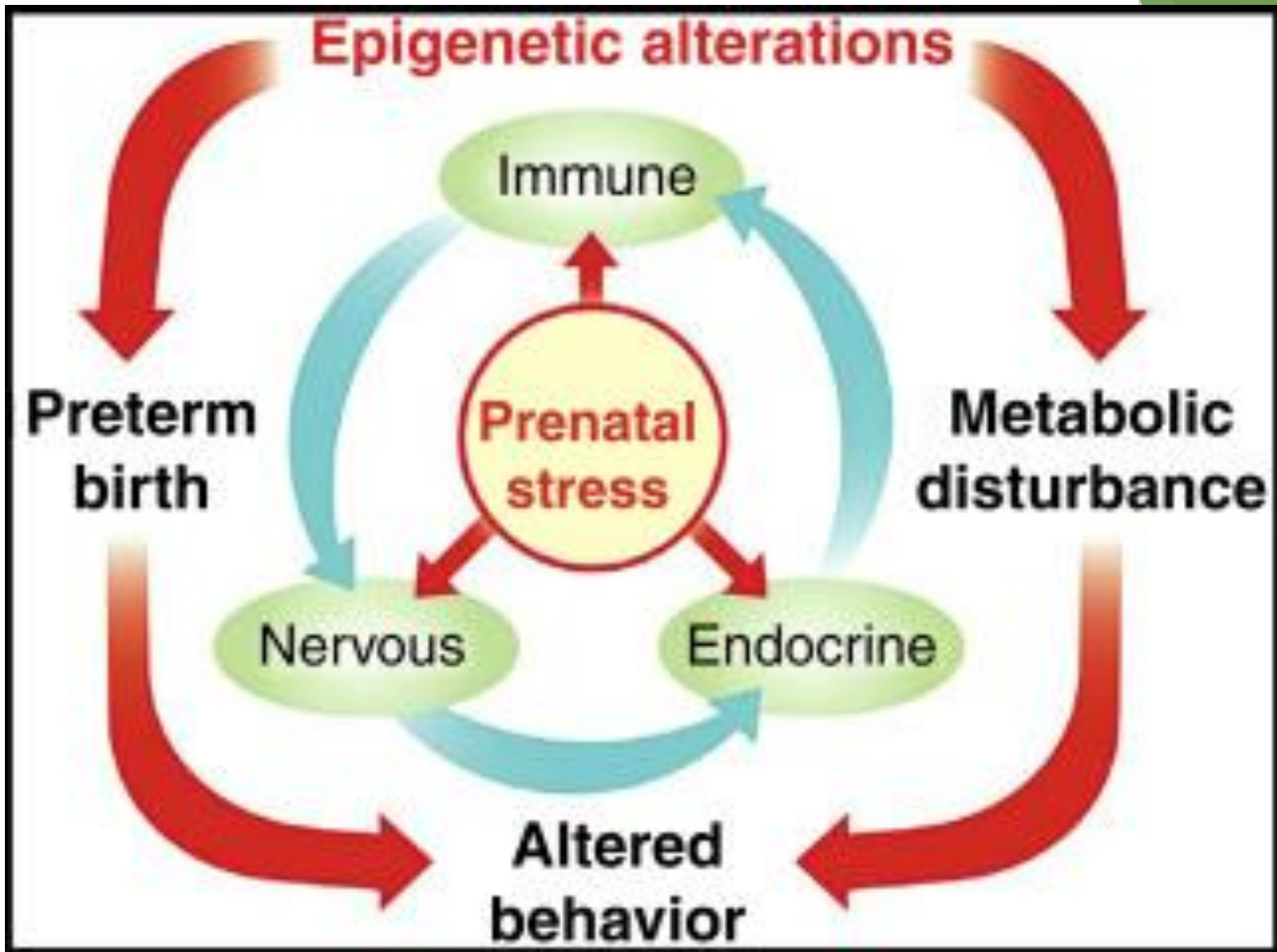
**Risk of:
Cancer
Obesity
Autism
Diabetes...**



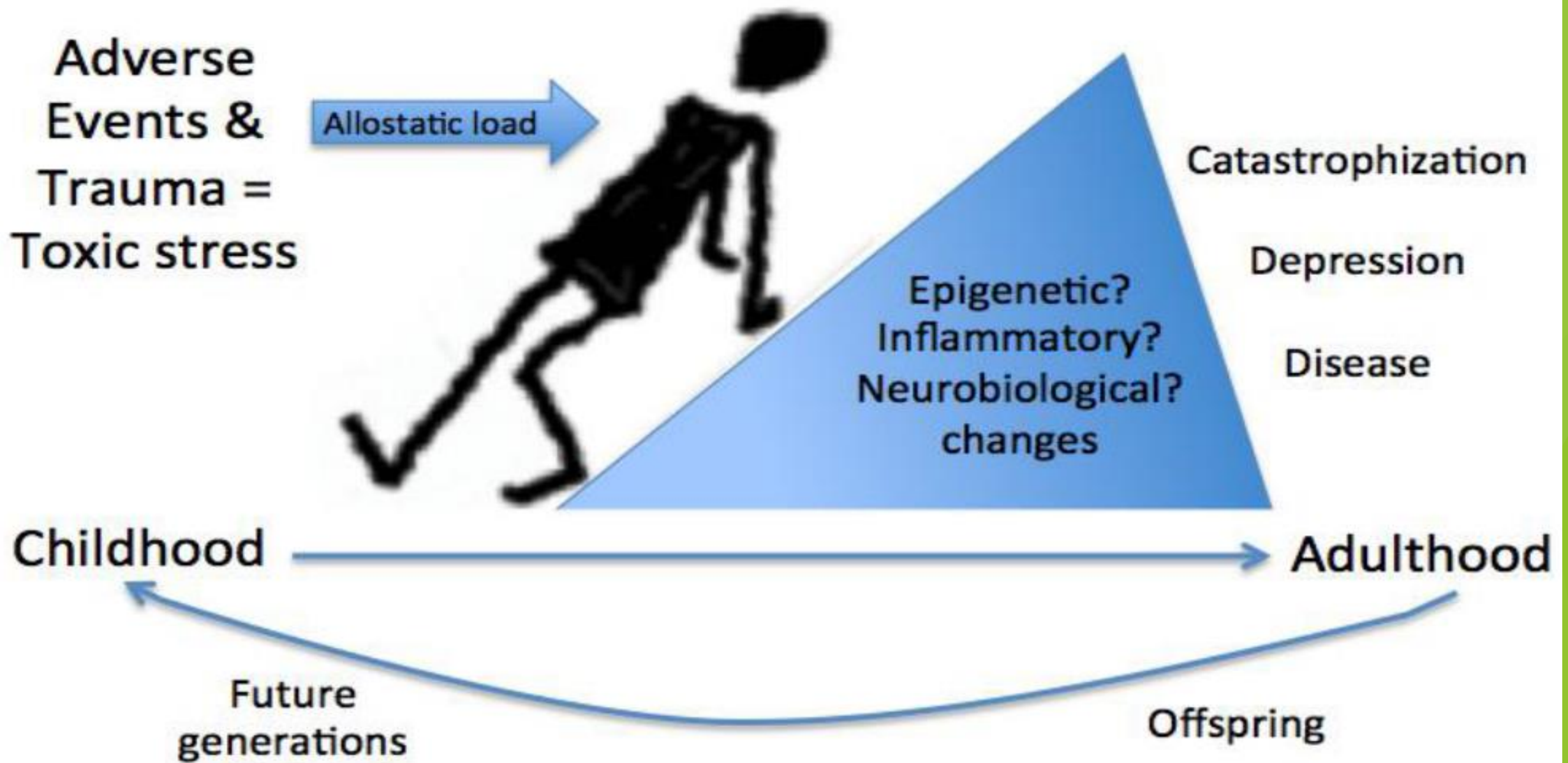
Prenatal

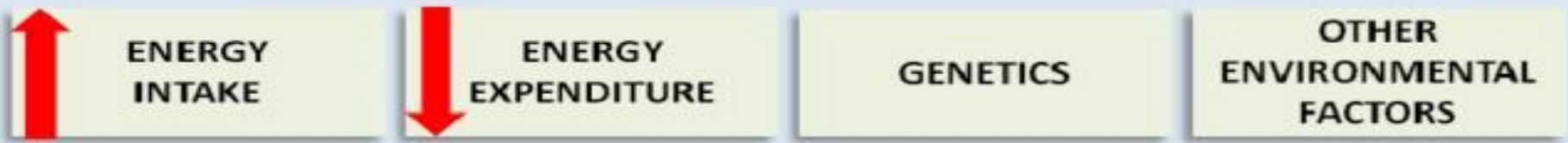
Postnatal





What happens in stressful situations?





OBESITY



PROTECTIVE
EFFECT



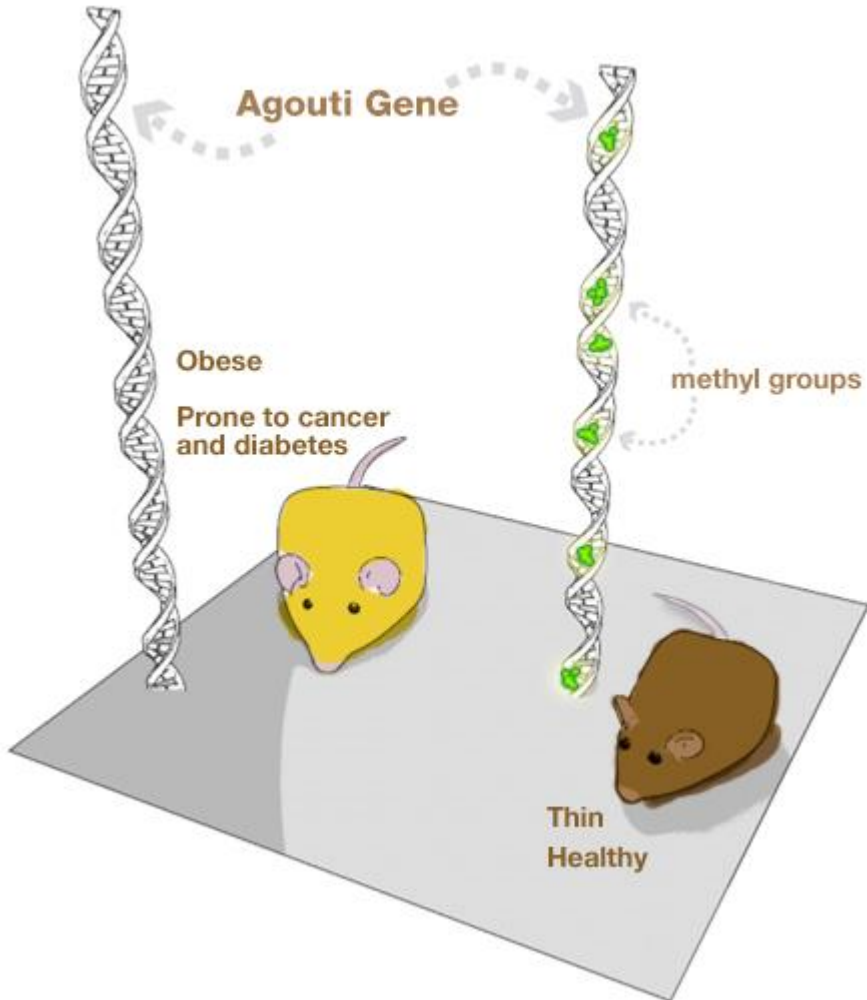
METABOLIC SYNDROME
INSULIN RESISTANCE



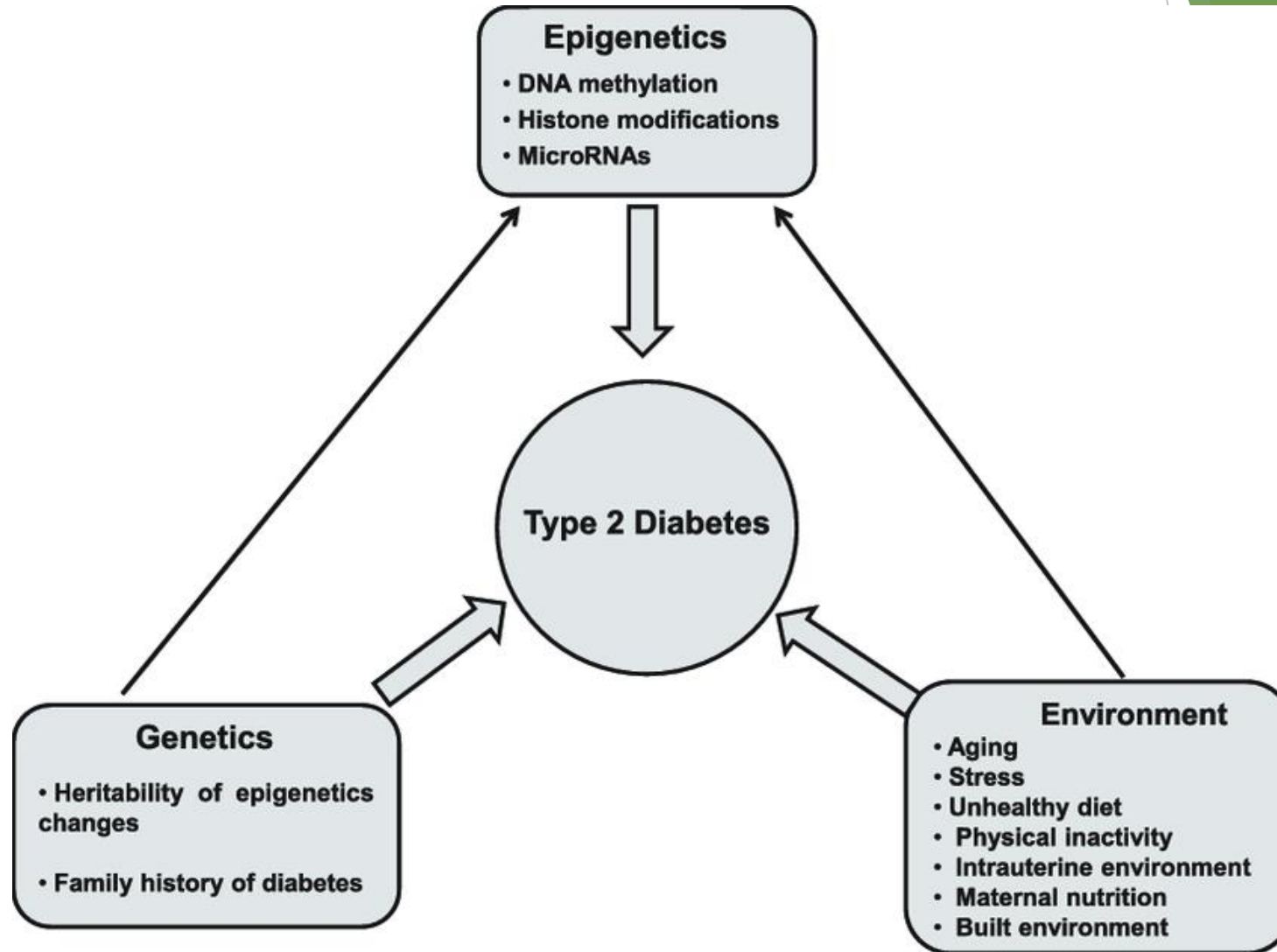
DELETERIOUS
EFFECT



The same genome but different Epigenetics



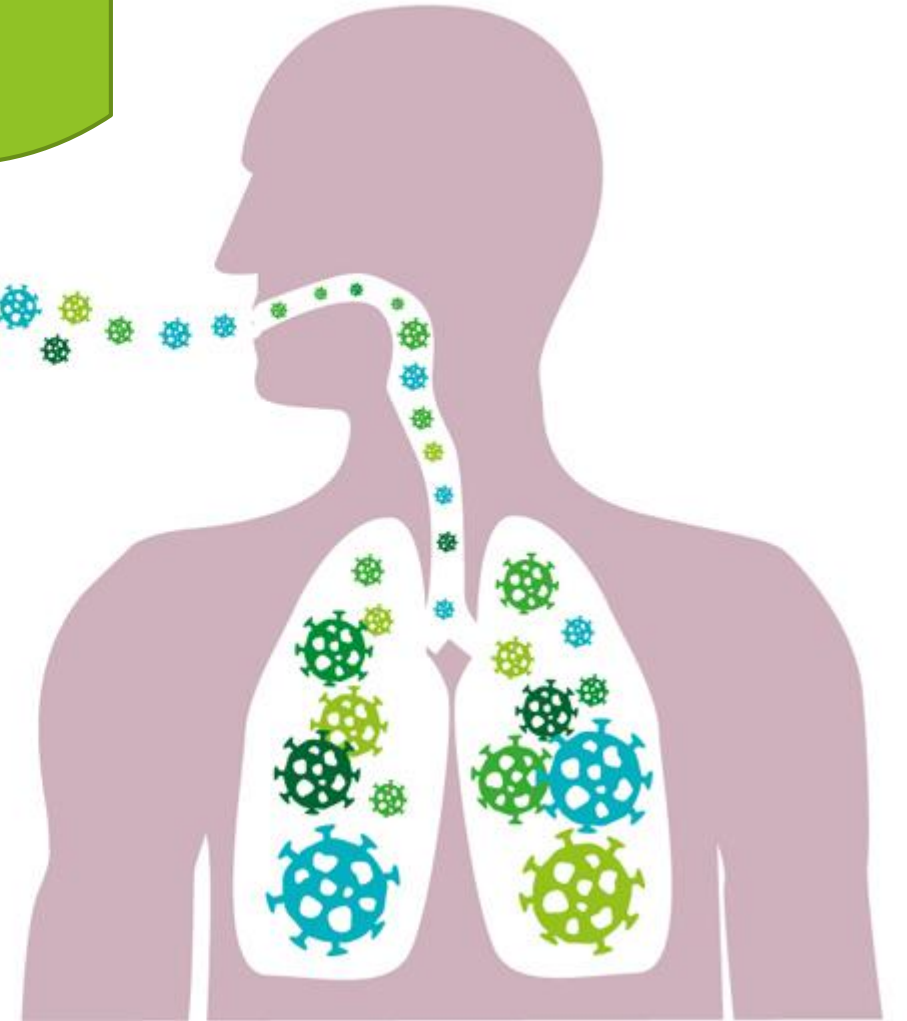
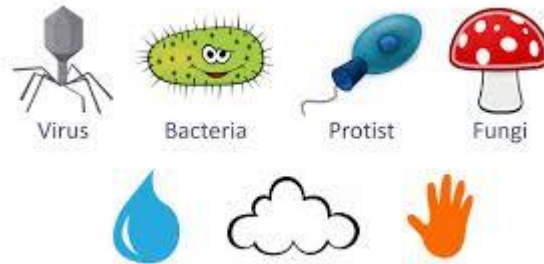
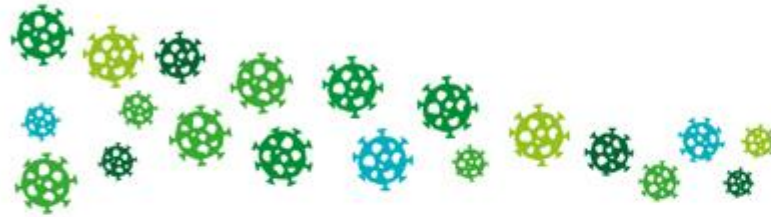
Diabetes & the effect of Epigenetics



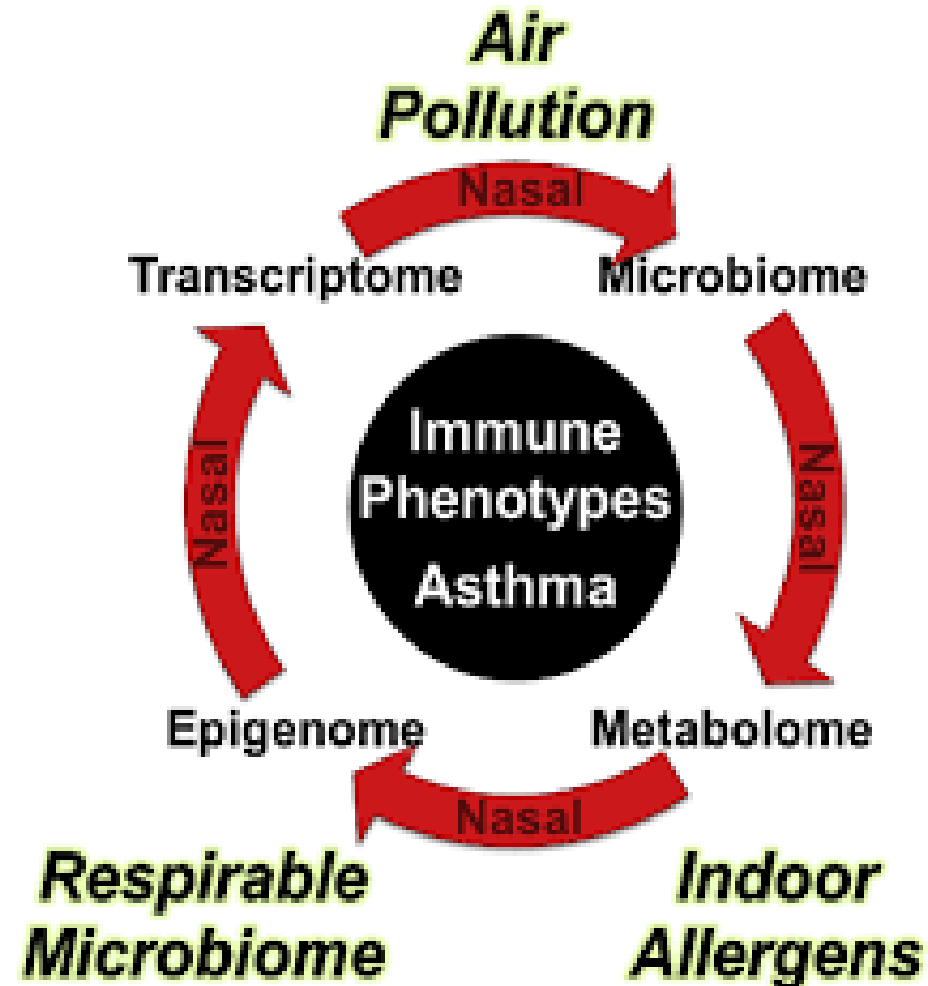
Asthma

Allergens act as epigenetic activators

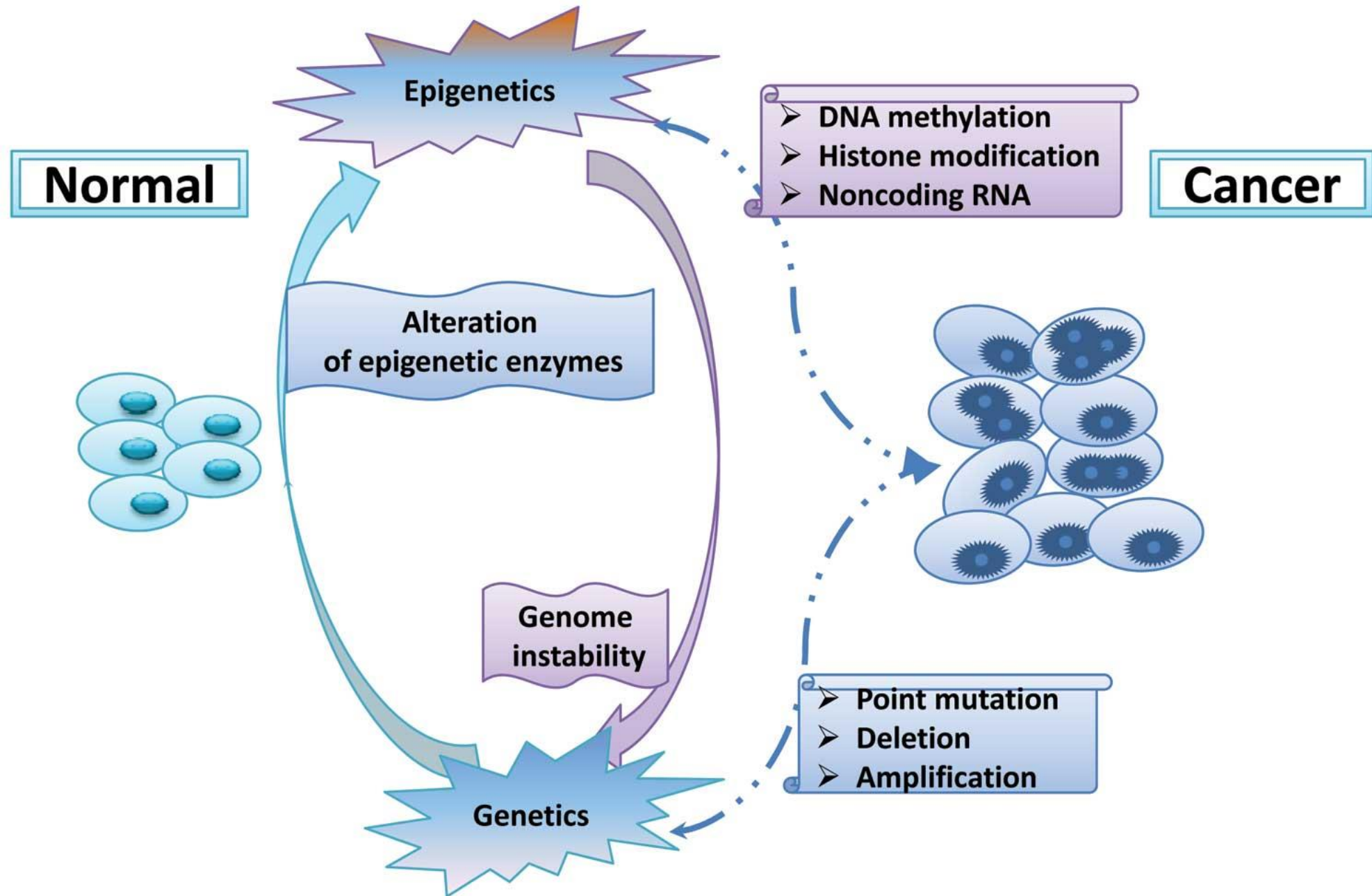
Allergens through our environment



The role of epigenetics in Asthma Cycle



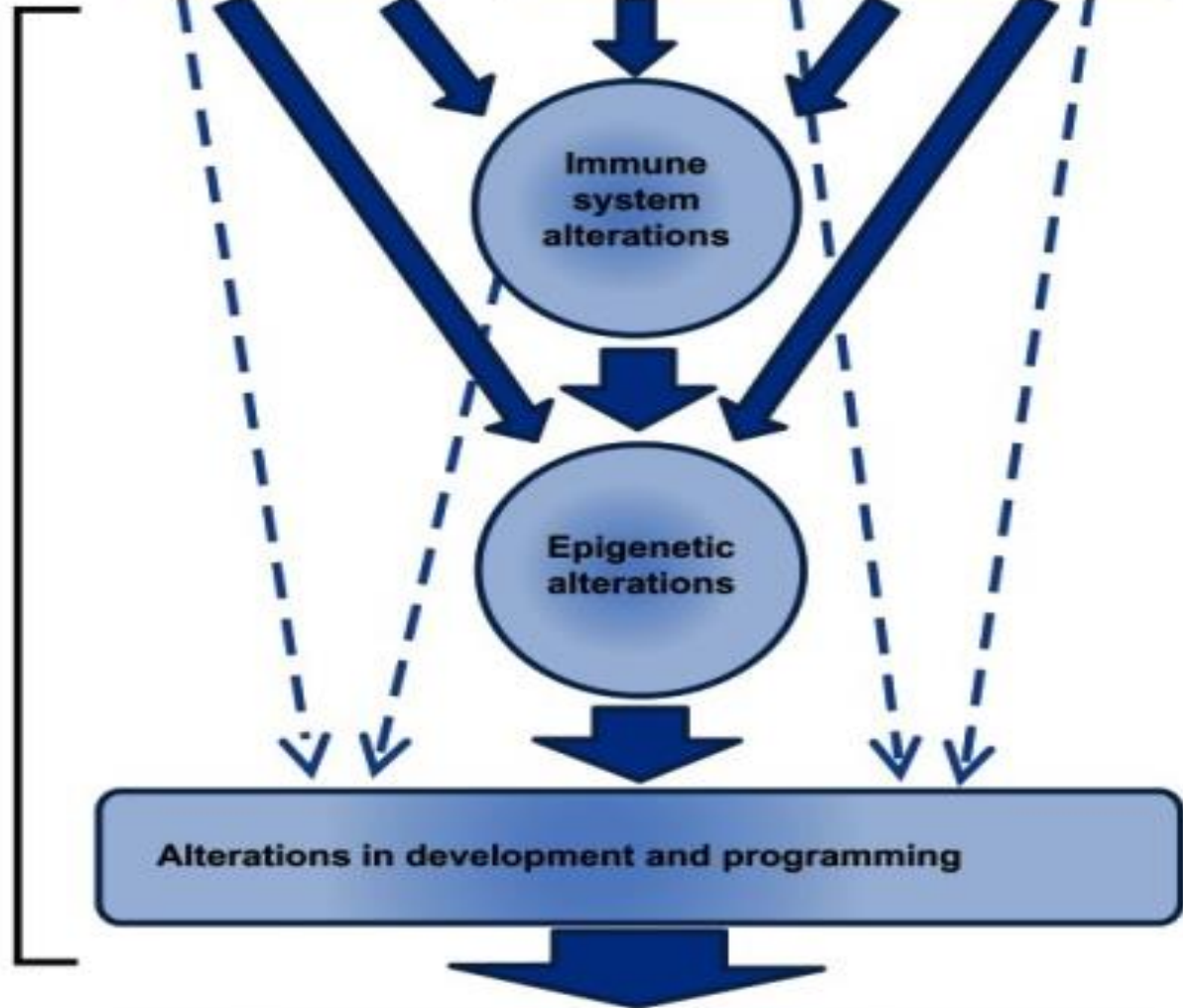
Epigenetics and Cancer



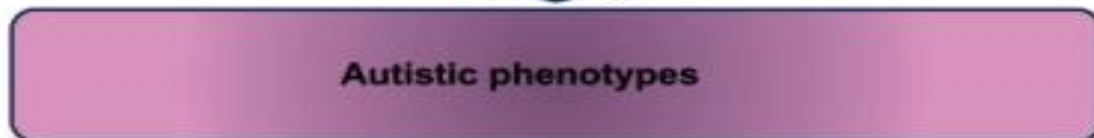
Environmental factors



Mechanisms



Output



Autism & Epigenetics regulation

Thank You

