

Endocrine Disruptors and Metabolic Syndrome

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INTRODUCTION

The incidence of Metabolic Syndrome, obesity and type 2 diabetes have increased significantly during the 30 years. New studies suggest the relationship between human exposure to some endocrine disruptors, with the development of metabolic syndrome.

The **aim** of this project is to evaluate the current evidence of the exposure to these substances and the prevalence of metabolic syndrome, as well as defining the main mechanisms of action.

ENDOCRINE DISRUPTORS

Endocrine disruptors (EDs) are substances or mixtures of exogenous substances present generally in plastic components, food and substances of anthropogenic origin¹.

They can act directly on hormonal receptors like agonists or antagonists as seen in *Figure 1*.

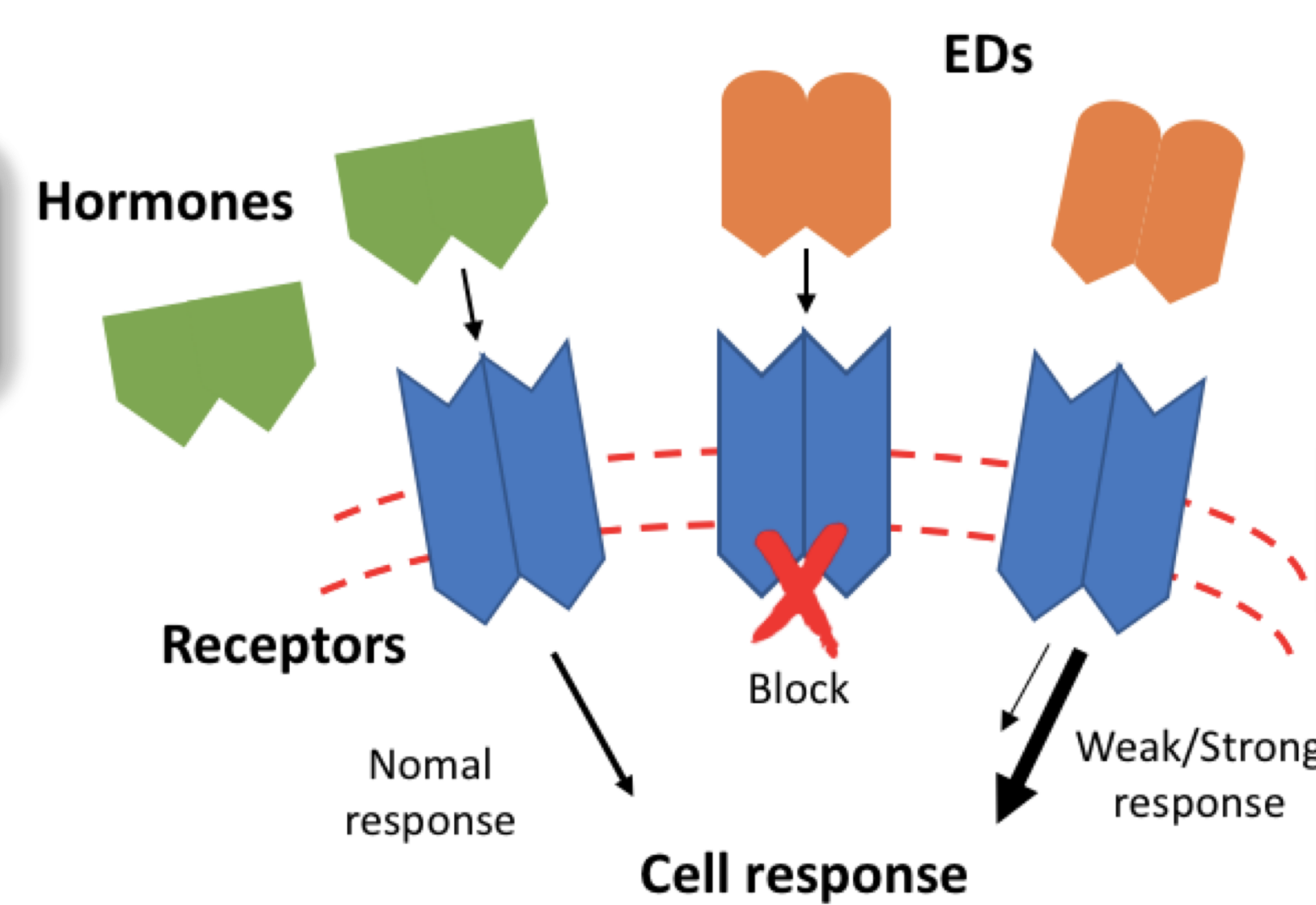
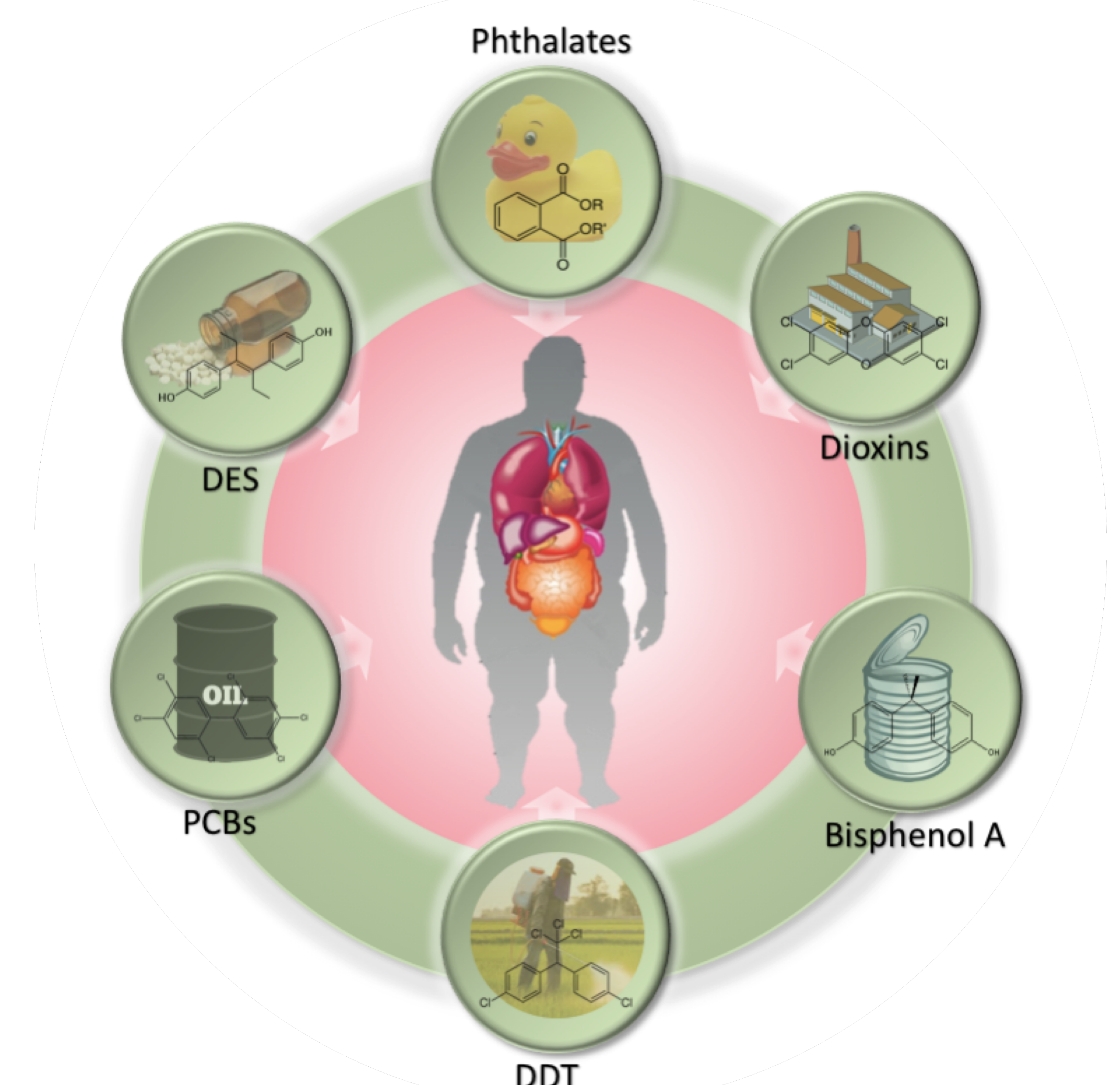
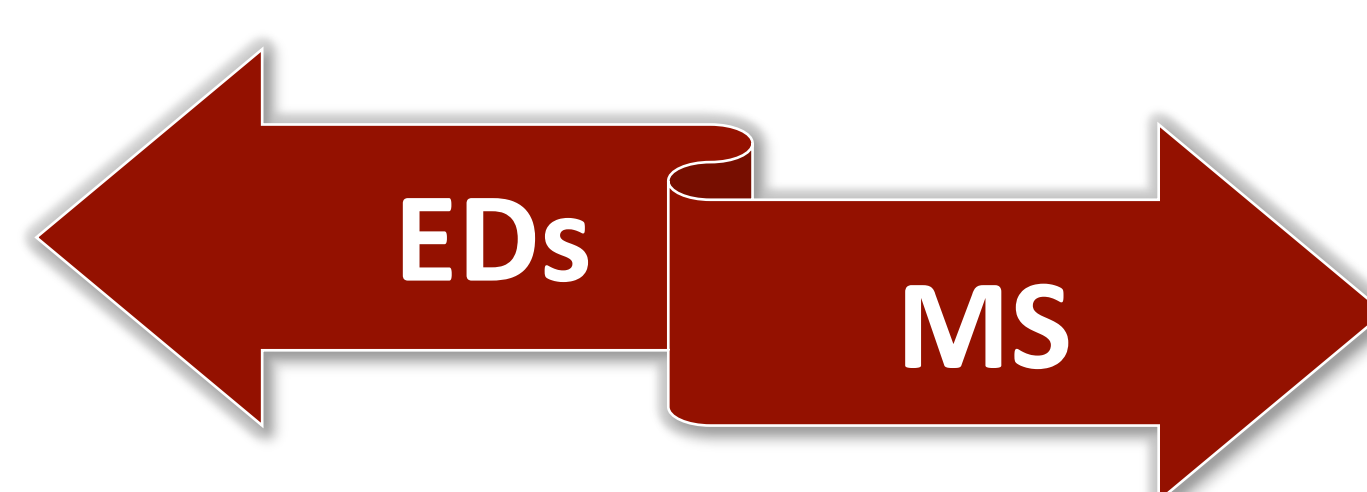


Figure 1: Endocrine disruption concept.



METABOLIC SYNDROME

Metabolic Syndrome is defined as a group of the most dangerous risk factors for cardiovascular disease and type 2 diabetes, and currently affects 25% of the global adult population².

Evidence *in vivo*

Table 1. Main diseases associated with exposure to metabolism disruptor chemicals (MDCs) according to experimental studies.

MDCs exposure	Related diseases
DES	Obesity
BPA	Obesity, insulin resistance
DDT	Obesity, insulin resistance, dyslipidaemia, metabolic syndrome
Phthalates	Obesity, insulin resistance
Dioxins	Obesity, insulin resistance
PCBs	Insulin resistance

Evidence in Humans

Table 2. Main diseases associated with exposure to metabolism disruptor chemicals (MDCs) according to epidemiological studies.

MDCs exposure	Related diseases
DES	Obesity
BPA	Obesity, insulin resistance
DDT	Metabolic syndrome
Phthalates	Obesity, insulin resistance
Dioxins	Diabetes, Obesity, arterial hypertension, metabolic syndrome.
PCBs	Diabetes

Mechanisms of Action

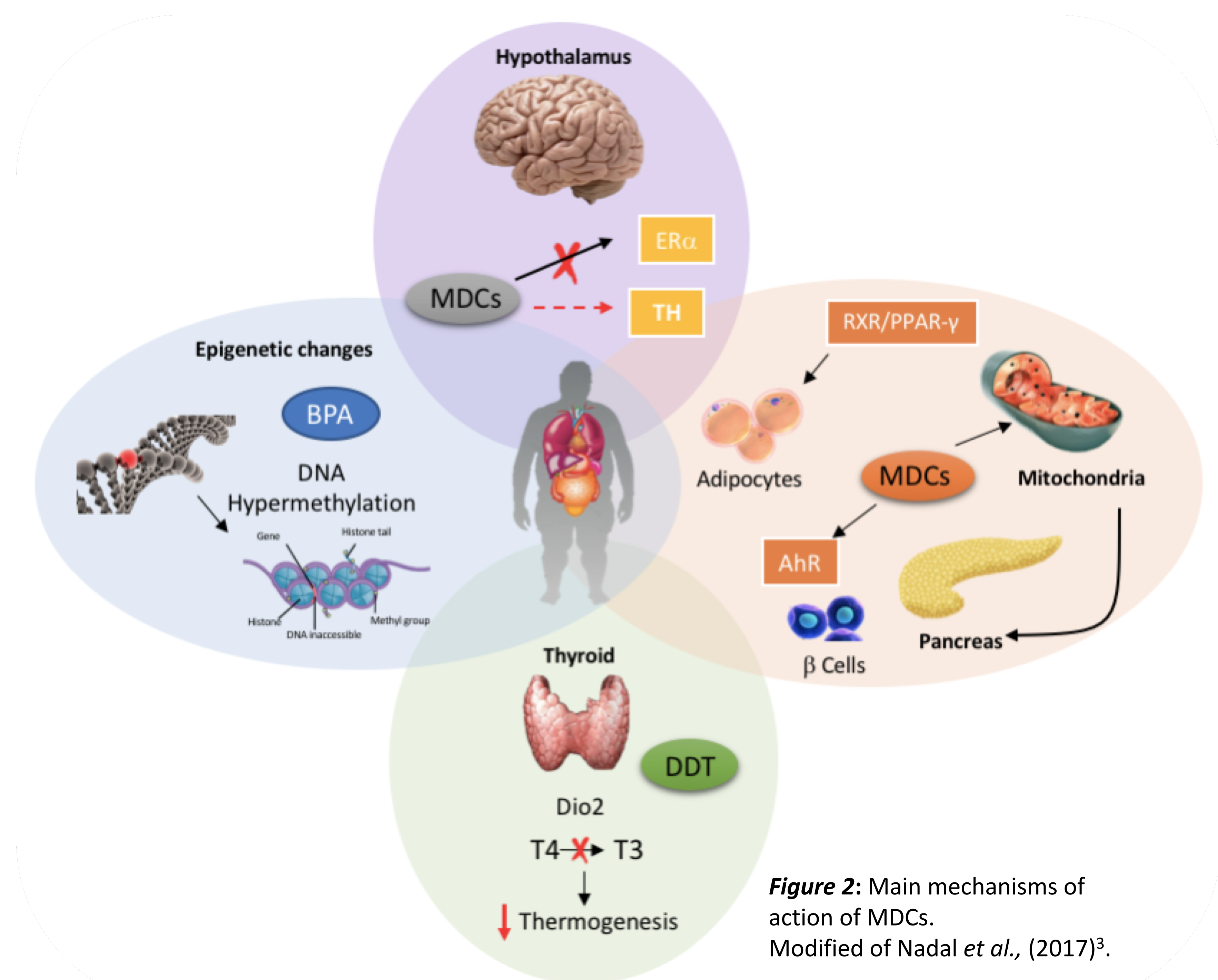


Figure 2: Main mechanisms of action of MDCs. Modified of Nadal *et al.*, (2017)³.

CONCLUSIONS

- There is a considerable evidence that MCDs contribute to the development of obesity, diabetes and metabolic syndrome.
- In epidemiological studies is complex to determine a causality between a specific metabolism disruptor chemical and these pathologies.
- The main problem is that it is currently impossible to identify population around the world that is not exposed to MCDs.
- The alteration of the energetic metabolism, intake control, thyroid hormone production and the epigenetic changes seems to be de main mechanisms of action in the development of metabolic syndrome and related diseases.

REFERENCES

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