

The authors declare no  
conflict of interest

# THE ROLE OF THE BISPHENOL A IN DIABETES AND OBESITY

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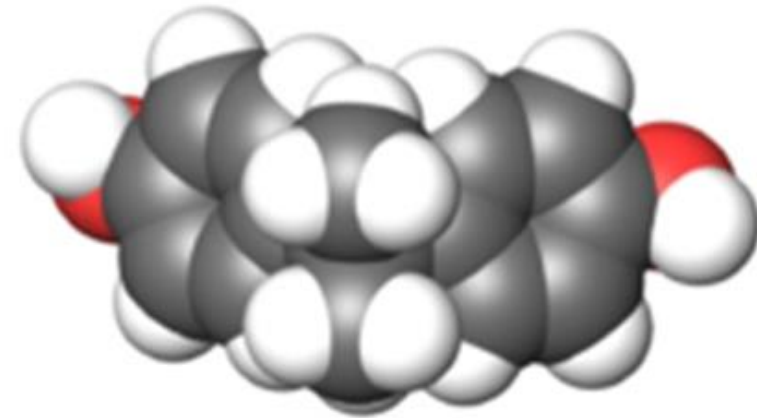
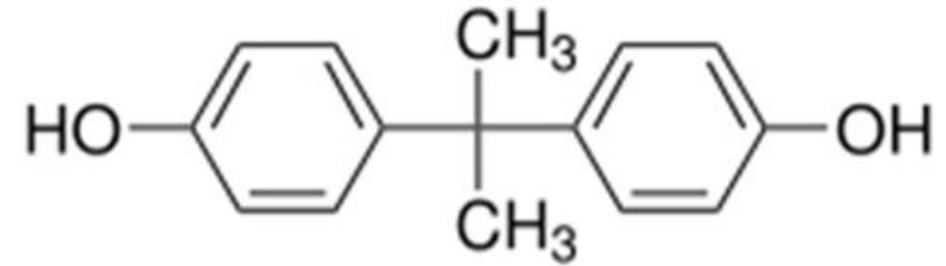
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## Bisfenol A



# INTRODUCTION

- An **ENDOCRINE DISRUPTOR (ED)** is an exogenous substance capable of producing changes in the endocrine system.
- Adipocytes and beta cells of the pancreas are targets of endocrine disruptors.
- Obesity and diabetes are public health problems of the 21st century.

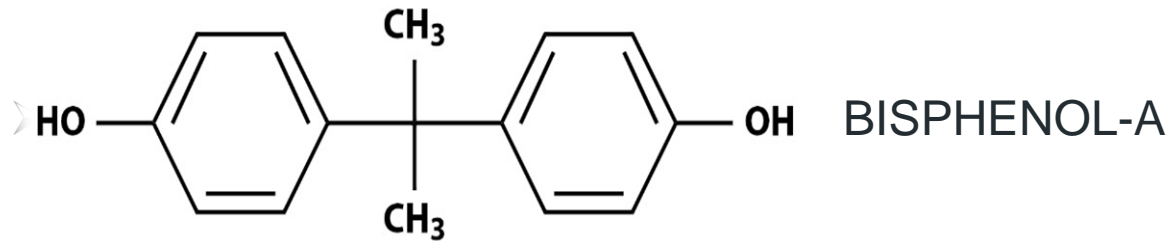


WELSHONS, 2006  
HUANG, 2012

OHLSTEIN ET AL, 2014

WHO, 2011

# INTRODUCTION



- BPA IS ONE OF THE MOST ABUNDANT ENVIRONMENTAL CHEMICALS
- WIDE PRESENCE IN EVERYDAY PRODUCTS
- MIGRATION FROM CONTAINER TO CONTENTS
- ABILITY TO MIMIC OESTROGENS



WELSHONS, 2006 HUANG, 2012

CUNHA SC 2011; CAO X-L 2010

TALSNES 2009; GODSON 2004

EFSA 2015; OLDRING 2014; WHO 2010

# HYPOTHESIS

*Repeated exposure to BPA may increase the risk of diabetes and obesity due to its ability to alter the endocrine system, in particular glucose and insulin homeostasis.*

# OBJECTIVES

## PRIMARY

Relationship between BPA ratio and alterations of glucose and insulin metabolism.

## SECONDARY

BPA estrogen-like activity at pancreatic cell level

Analyze if at doses similar to those found in the environment alterations occur in humans

# SEARCH METHODOLOGY

**What effect does exposure to bisphenol A have on glucose and insulin metabolism?**

<b>P</b>	Animal and human population exposed to BPA
<b>I</b>	Exposure to BPA
<b>C</b>	No exposed population
<b>O</b>	Variation in the metabolic response of glucose and insulin

Stone PW. 2002



# SEARCH METHODOLOGY

## Literature research

- Medline y Web of science

## MeSH

- bisphenol A', 'BPA', 'obesity', 'insulin resistance', 'glucose intolerance'

## Research

- Guidelines PRISMA Working Group <sup>(1)</sup>

## Research evaluation

- Grading of Recommendations, Assessment, Development and Evaluation (GRADE) <sup>(2)</sup>

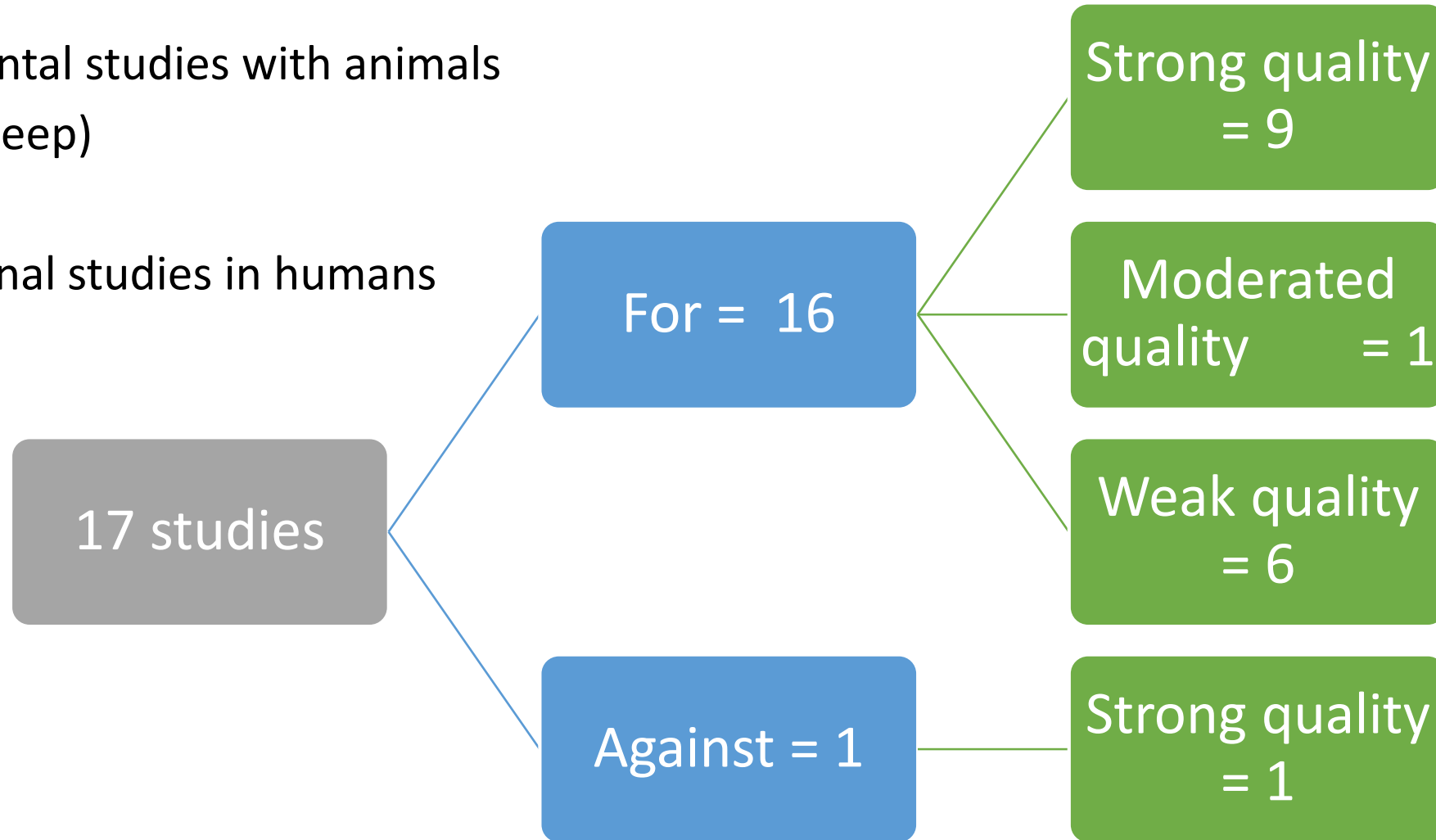
1. The PRISMA Group.,2009.

2. GRADE Working Group. Grading quality of evidence and strength of recommendations, 2004.

# SEARCH METHODOLOGY

12 experimental studies with animals  
(mice and sheep)

5 observational studies in humans



# DISCUSSION

The findings suggest that BPA can act as an endocrine disruptor by altering the homeostasis of glucose and insulin.

*BATISTA 2012,  
BANSAL 2019*

The alterations produced by BPA in glucose and insulin homeostasis are more striking at small doses and during the fetal season.

*ANGLE 2013,  
SORIANO 2012,  
LIU 2013*

*SUSIARJO 2015,  
GARCÍA-ARÉVALO 2016,  
WHITEHEAD 2016*

# DISCUSSION

Animal exposed to BPA showed signs of obesity and metabolic alterations such as increases in triglyceride levels, hyperinsulinemia and insulin resistance.

*BATISTA 2012, SUSIARJO 2015,  
BANSAL 2019, GARCÍA-ARÉVALO  
2016, WEI 2016, RUBIN 2017*

Studies conducted in humans support the hypothesis of the triple association between BPA obesity and diabetes, but some have a weak quality of evidence.

*WANG 2012, LEE H 2013, WANG 2019,  
SAVASTANO 2015, STAHLHULT 2018*

# DISCUSSION

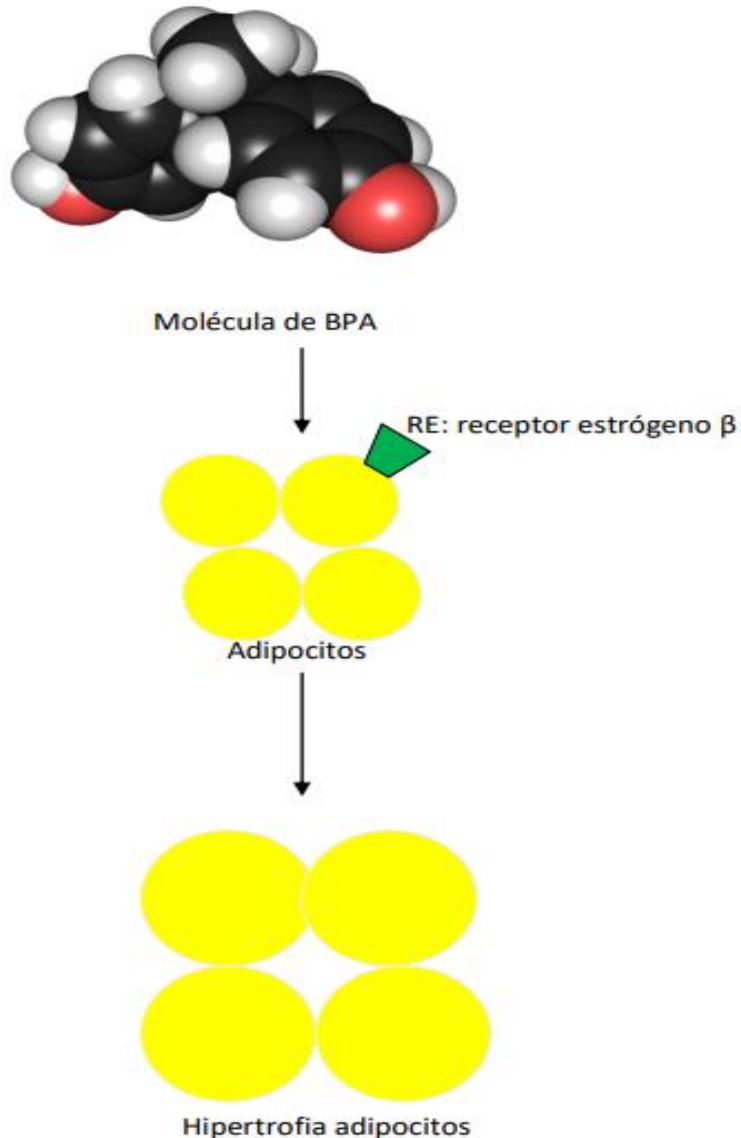


Image: own elaboration

BPA can interact with adipocyte ER and could promote adipocyte hypertrophy

WANG 2012  
WEI 2011  
VEIGA-LOPEZ 2016  
SAVASTANO 2015

# CONCLUSIONS

1. Endocrine disruptors may be an additional risk factor to consider in the development of obesity.
2. BPA can alter the endocrine system by promoting insulin resistance.
3. Lack of international consensus on their security.
4. Possibly different effects between females and males.
5. Epidemiological studies suggest that we might find the same alterations seen in experimental animal studies.



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