

THE ROLE OF POLYCHLORINATED BIPHENYLS IN OBESITY – REVIEW STUDY

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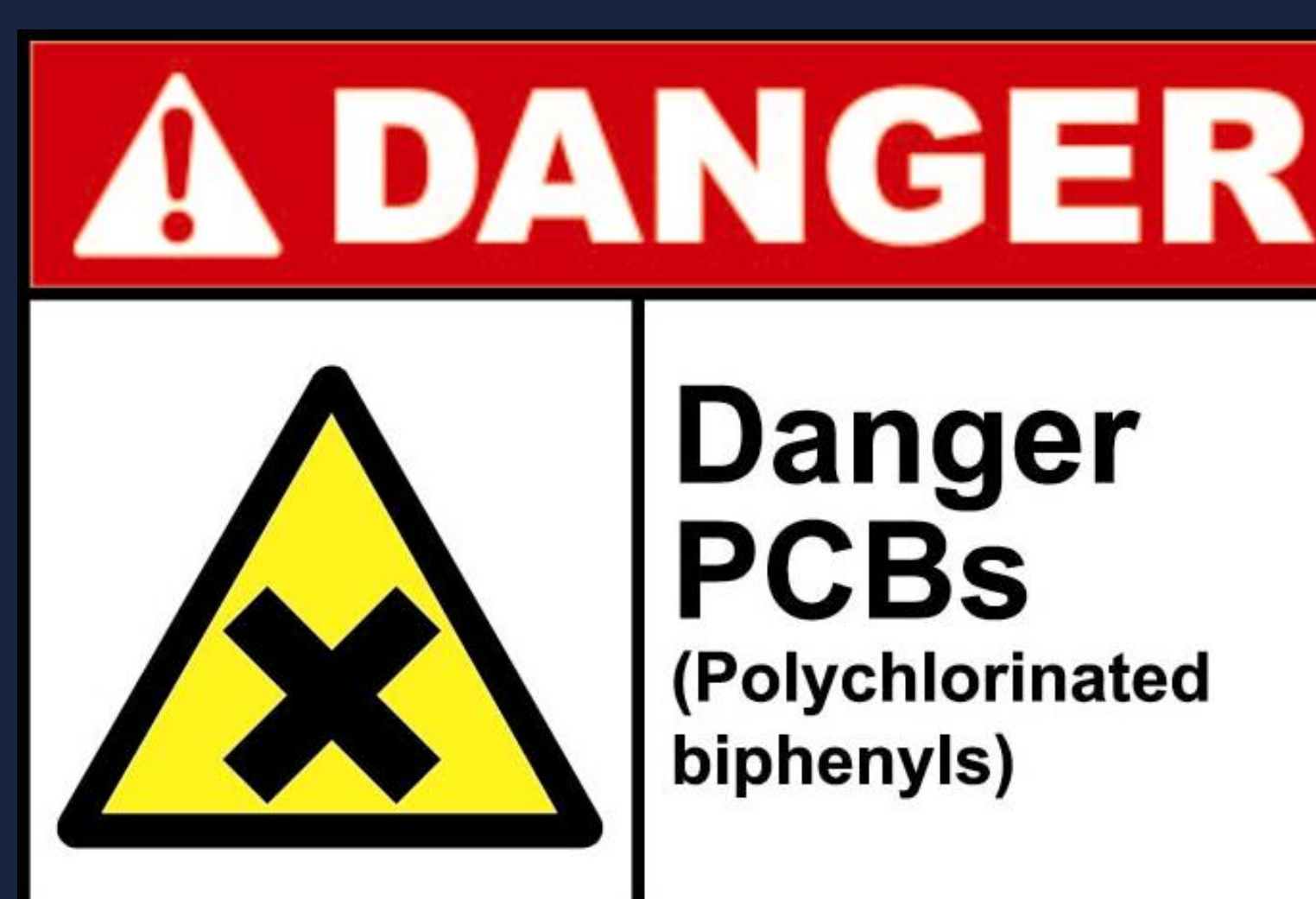
AIM

The aim of the study was to determine the obesogenic effect of polychlorinated biphenyls, to discuss its mechanism of action, effects on the human body and role in obesity.

MATERIALS AND METHODS

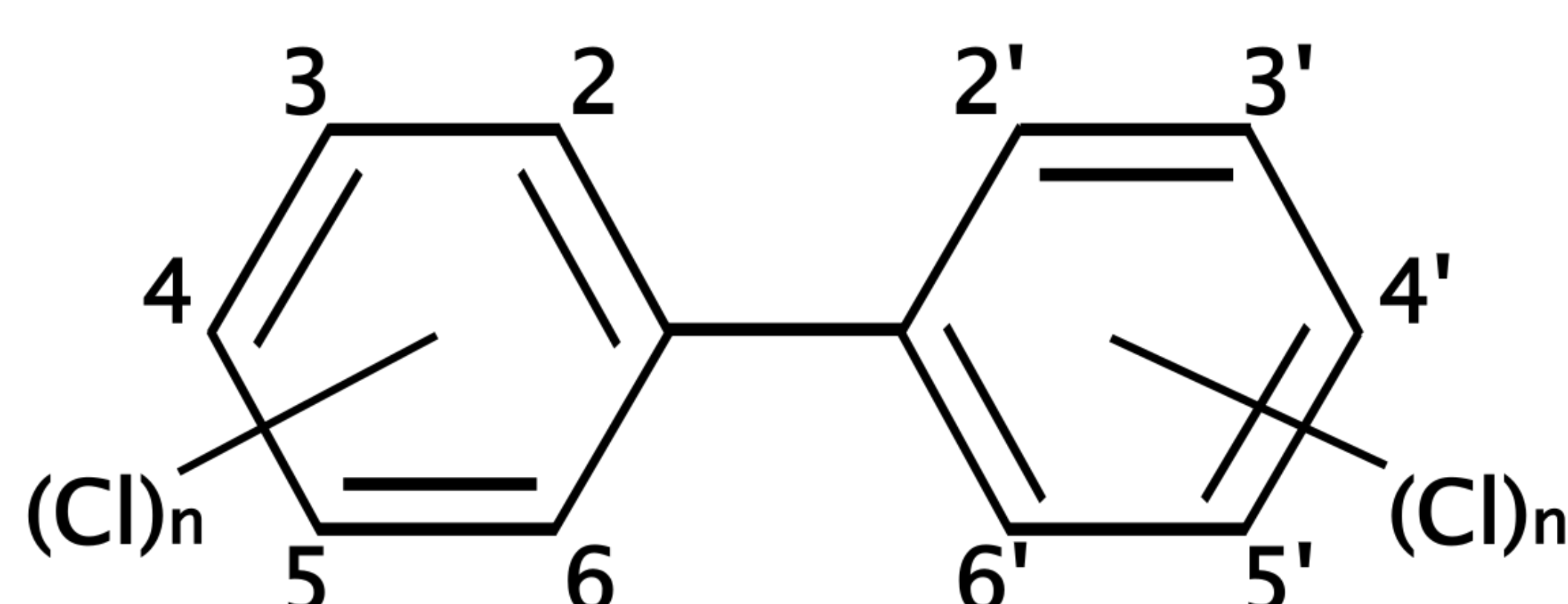
We researched the scientific literature that focused on PCBs role in obesity and metabolism.

- ➞ Polychlorinated biphenyls are one of multiple factors contributing to obesity development.
- ➞ PCBs belong to the group of **endocrine disrupting chemicals** (EDCs).
- ➞ Together with other EDCs, they alter hormonal balance and interfere with adipocyte differentiation and adipose tissue function.



The History of PCBs

- Polychlorinated biphenyls (PCBs) were introduced in 1929 and have been used as plasticizers, insulating fluids, coolants, sealants and adhesives.
- Due to its toxicity, the production was banned in many countries – in 1978 by the United States and in 2001 by the Stockholm Convention on Persistent Organic Pollutants.
- Nevertheless, **to this day many regions of the world still suffer from long-term contamination.**



Chemical structure of PCBs

Effects on the human body

Known negative effects of PCB exposure include chloracne, rashes, liver damage, respiratory issues, immune system disorders but it also contributes to obesity development.

PCBs increase lipogenesis, decrease fatty acid oxidation, and increase fatty acid uptake to the liver as well as decrease hepatic VLDL secretion ultimately increasing the risk of Type 2 DM.

Review

- A review published by Newbold RR claimed that brief exposure to environmental EDC early in life, can lead to increased body weight later in life.
- Additionally, a study conducted in 2020 by Ellsworth et al showed that PCBs have a negative association with infant head circumference and weight in the first 6 months of life, which are contributing factors towards altered infant growth. The same study found an association between maternal obesity and higher levels of PCBs in human milk.
- Donat-Vargas et al. conducted a study which included 12,313 participants, which showed that an increased dietary PCB intake is directly associated with a higher incidence of obesity. The participants with the highest quintile of PCB intake at the baseline had a 58% higher risk of obesity development compared to individuals with the lowest quintile of intake.

Conclusion

Obesity has a complex etiology, including genetic, behavioral, and environmental factors. Polychlorinated biphenyls are one of multiple factors contributing to obesity development. During recent years, numerous studies have been conducted to analyze this matter. Although there is a consensus that PCBs are correlated with obesity, this topic still needs further research, as all studies have their limitations, and the results are ambiguous.

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