

# Triclosan and endocrine disrupting potential: A hypothesis-driven weight of evidence analysis.

Critical Reviews in Toxicology. 2017; 47(4):263-285..

## AUDIENCE

This writing sample illustrates different strategies used to communicate with technical and non-technical audiences. The technical excerpt is followed by a novice excerpt intended for adults with an understanding of basic biology but no expertise in toxicology.

## ABOUT US

Takmos LLC is a technical writing firm based in Ventura, California serving a range of industries.

We specialize in capturing tribal knowledge, creating manuals and procedures, and providing plain language summaries of technical materials.

## CONTACT

**Takmos LLC**

**web:** [www.takmos.com](http://www.takmos.com)

**email:** [info@takmos.com](mailto:info@takmos.com)

**telephone:** 805-628-3574

## TECHNICAL EXCERPT

Consistent with the US Endocrine Disruption Screening Program (EDSP) guidelines, a weight-of-evidence analysis was completed for the antimicrobial ingredient triclosan. A total of ninety peer-reviewed references were scored for reliability using a standard rating scale and a tool developed by ECVAM (European Union Reference Laboratory for Alternatives to Animal Testing); studies deemed less reliable were not excluded from the analysis but were weighted proportionately to their reliability. Where a study was generally consistent with a validated assay, it was included in the analysis even if it was not conducted strictly per guideline methods. The EDSP guideline focuses on four critical endocrine pathways most commonly symptomatic of endocrine disruption: estrogen, androgen, thyroid and steroidogenesis.

In general terms, estrogen and androgen pathways are those most readily associated respectively with female and male sexual maturation and reproductive function; the thyroid regulates energy metabolism within the body and therefore influences growth and development; steroidogenesis is the pathway by which steroids (including androgens and estrogens) are synthesized. The weight of evidence framework uses 11 validated assays defined as the USEPA Endocrine Disruption Screening Program Tier 1 Assays; tier 1 assays are intended to identify those chemicals with the potential for endocrine disruption that may be submitted for further testing in multi-generational animal studies. [TRUNCATED]

## NOVICE EXCERPT

Triclosan, an antimicrobial ingredient found in handsoaps and toothpaste, has been incorrectly described as an endocrine disruptor -- a chemical that interferes with the endocrine system.

In living organisms, including humans, the endocrine system uses chemical messages called hormones to regulate normal processes in the body, including how energy from food is utilized, to growth, development, and reproduction. The term endocrine disruption is most simply described as interference with natural hormonal processes in the living organism.



# Takmos



## NOVICE EXCERPT CONTINUED

In some instances chemicals found in the environment can mimic or block the actions of naturally occurring hormones found in an organism. These external hormonal signals can activate processes that would normally not occur in the organism or can prevent normal physiologic processes from happening.

Identifying chemicals that are endocrine disruptors is very challenging. The endocrine system is complex and regulates many processes in the body. As a result, there is not a single test to identify chemicals that can interfere. In fact, to identify an endocrine disrupting chemical, the overall pattern of responses in multiple tests must be considered. This is similar to how a doctor performs a diagnosis -- by considering all the signs and symptoms of illness and looking for a pattern consistent with a particular disease state.

A cough can be a symptom of a number of illnesses (everything from hay fever to cancer), but the physician considers whether the cough is accompanied by fever, whether phlegm is produced, etcetera. In some instances, the physician might collect more information through conducting laboratory tests to confirm a diagnosis.

The United States Environmental Protection Agency (USEPA), after a decade long international collaboration, has determined that a similar process applies to identifying endocrine disrupting chemicals. No one data point diagnostic of endocrine disruption; there has to be a pattern among multiple data points.

The USEPA worked with an international committee of experts to develop 11 tests (some of them are in animals and some of them are in cell cultures - called in vitro tests) to identify endocrine activity in chemicals. Through the endocrine disruptor screening program, chemicals that have a "positive" response in the 11 screening tests are

required to undergo further testing in more complicated animal tests.

The analysis completed for the antimicrobial compound triclosan is called a weight of evidence. This analysis included a review of more than 90 published studies on triclosan. The USEPA has published case studies of known endocrine disrupting compounds to demonstrate the changes one would expect to see if a chemical has the ability to affect the endocrine system.

Triclosan has been described in the press as an "endocrine disruptor" yet, when the results for triclosan are compared to examples of known endocrine disruptors studied by the USEPA, the pattern indicative of an endocrine disruptor is not present. There are studies reporting changes to one or more of these endocrine sensitive endpoints in organisms exposed to triclosan, but the necessary patterns across multiple data points do not exist.

It is important to remember that USEPA cautioned not to place emphasis on a single data point or data points, but to consider the overall pattern of the evidence. Due to the complexity of the endocrine system, there can be multiple reasons a specific endpoint might change, it is not necessarily due to interference with the endocrine system. The most common reason an endpoint might change is simply due to toxicity.

Just as cough alone does not indicate lung cancer, the presence of certain changes in endocrine processes by themselves do not indicate endocrine disruption.

[TRUNCATED]

