

# A Decade of Toxicological Trends: what the papers say

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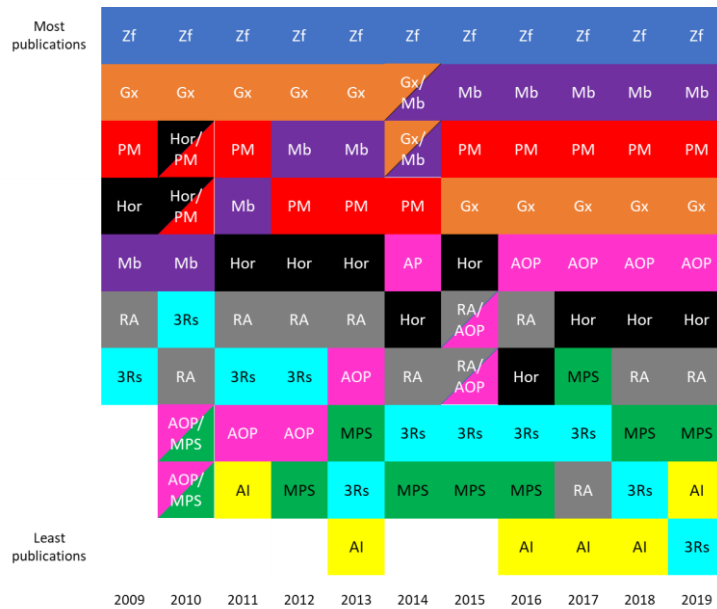
## 1. Objective

- To track popular trends and concepts in toxicology over the decade 2009-2019.

## 2. Methods

- A search of PubMed (www.ncbi.nlm.nih.gov/pubmed) was performed for each concept using search terms, which included relevant synonyms.
- The search terms were input within quotation marks and searched in addition to "AND \*toxic\*" to ensure all toxicologically relevant publications were returned.
- The number of toxicologically relevant publications in each concept were recorded for each year from 1<sup>st</sup> of January to 31<sup>st</sup> of December.

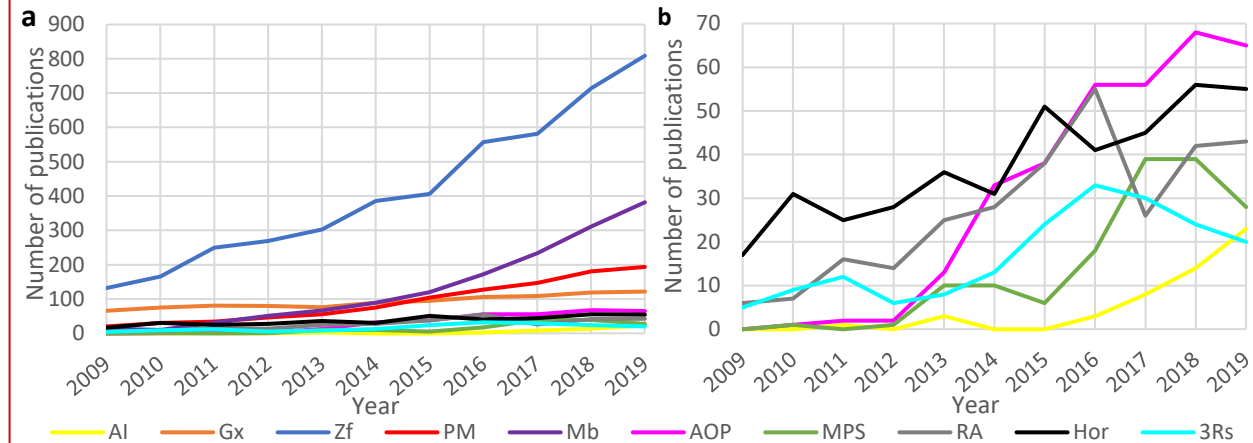
## 3a. Results



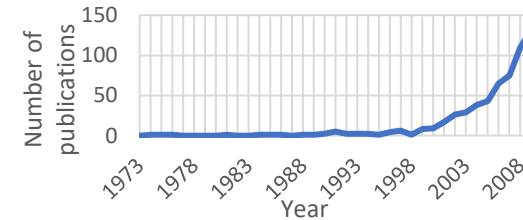
**Figure 1 Trends in toxicology publications from 2009-2019.** Each of the top 10 concepts are ranked based on number of publications from most to least per year to track changes over time.

AI: artificial intelligence, Gx: genomics, Zf: zebrafish, Hor: hormesis, PM: personalised medicine, Mb: microbiome, RA: read-across, 3Rs, AOP: adverse outcome pathway, MPS: microphysiological systems.

## 3b. Results



**Figure 2 Trends in publications related to toxicology from 2009-2019.** a) Number of publications in all concepts per year, b) Concepts with less than 70 publications in 2019.



**Figure 3 Number of Zebrafish publications 1973 - 2009.**

## 4. Summary and Conclusions

- The data revealed an upward trend in the number of papers across all the concepts from 260 in 2009 to more than 1700 in 2019.
- Zebrafish, genomics and personalized medicine remained in the top 4 slots since 2009 with zebrafish dominating the rankings.
- Other notable trends were the ascendancy of the microbiome and AOPs and the descendancy of hormesis and the 3Rs.
- The top 4 slots have been static over the past 4 years, suggesting that new ideas take time to find their place in scientific culture.
- In conclusions, tracking toxicology publications 2009-2019 provides insight into possible uptake of new areas such as CRISPR and AI.