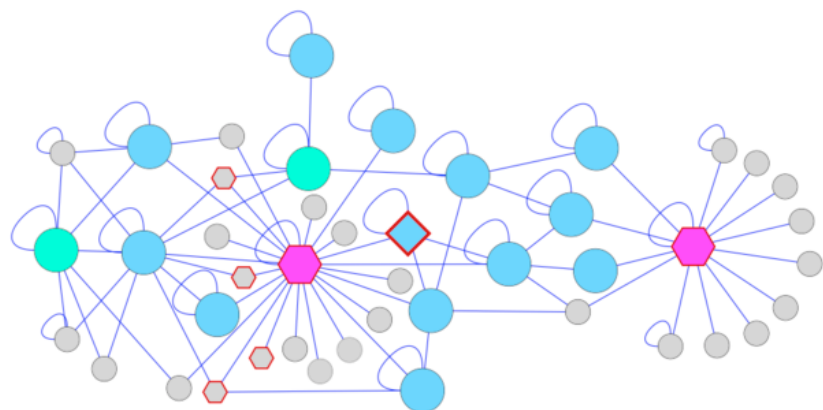


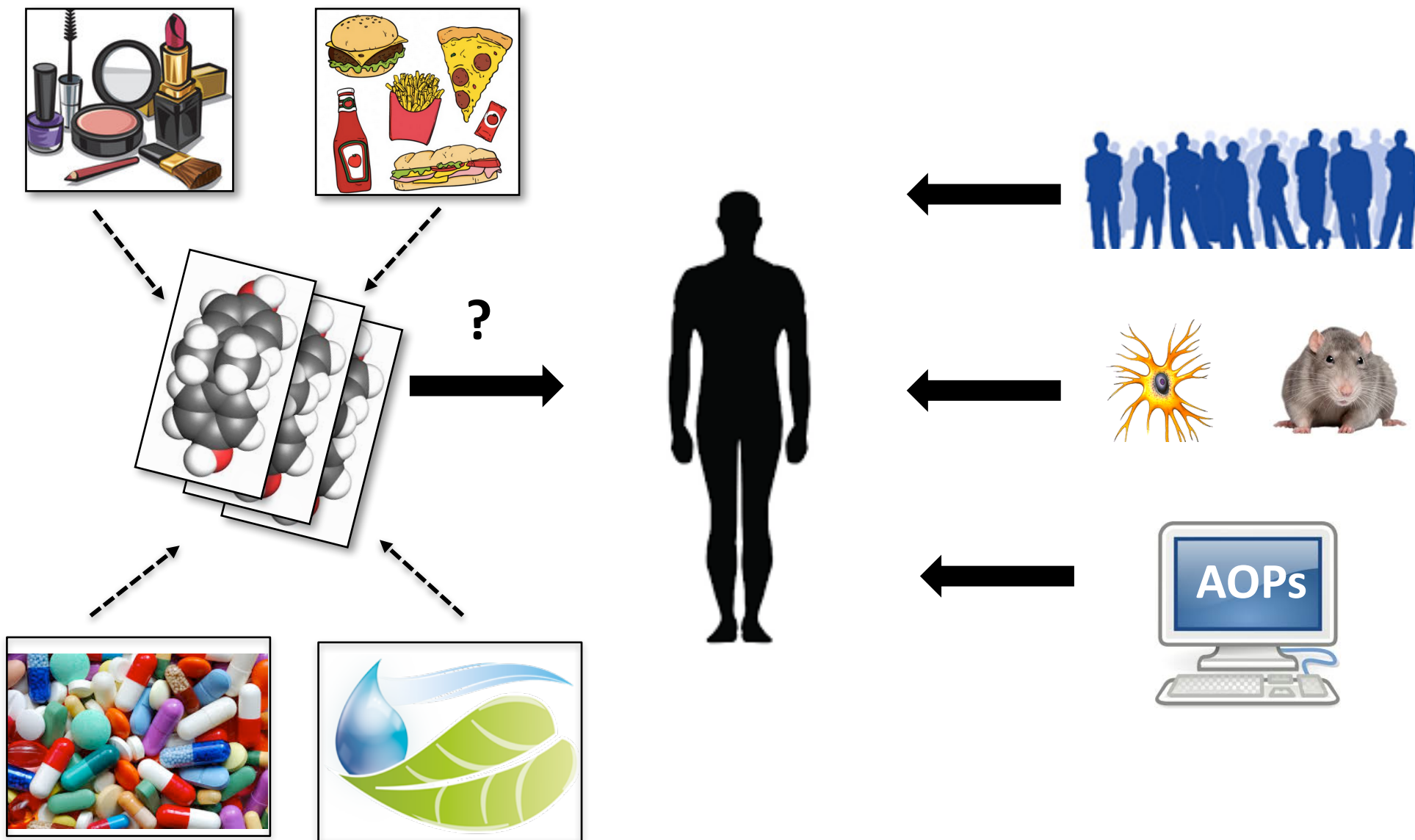
Combining Artificial Intelligence and Systems Biology for bisphenol S Toxicity Evaluation



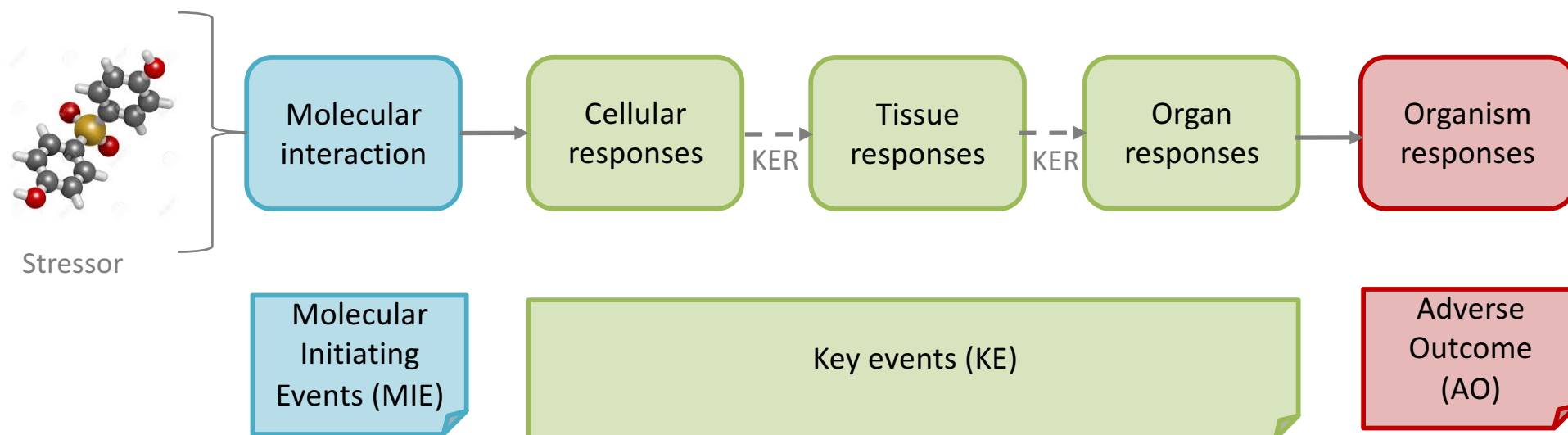
Karine Audouze
Ass. Prof., Université de Paris

karine.audouze@univ-paris-diderot.fr

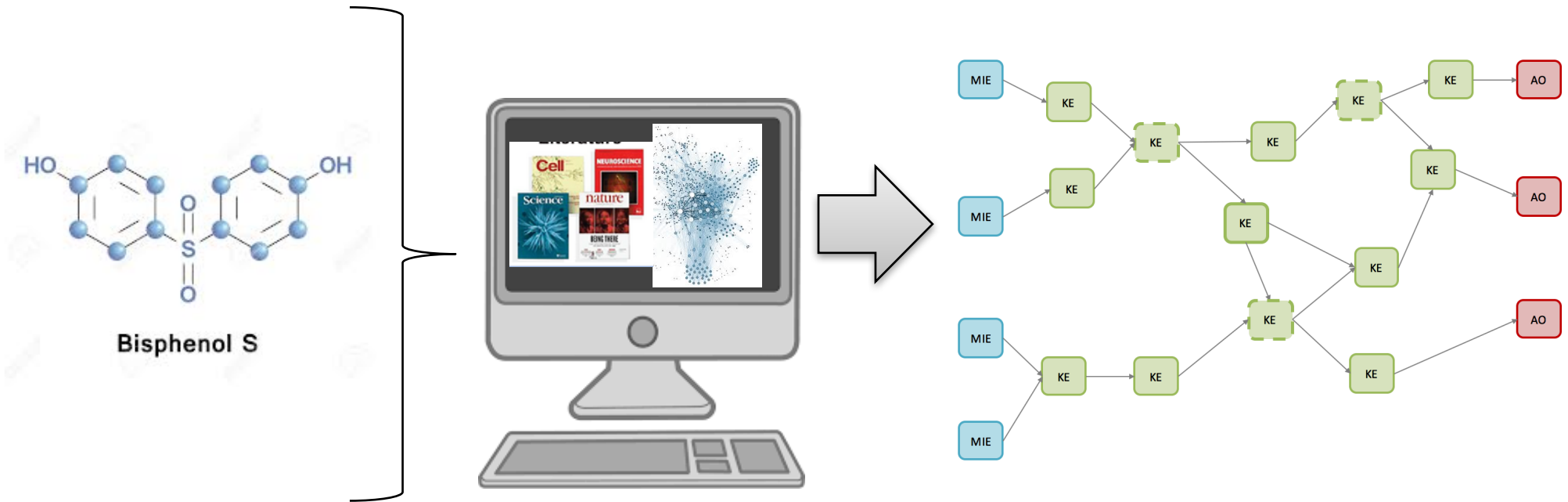
Chemical toxicity evaluation



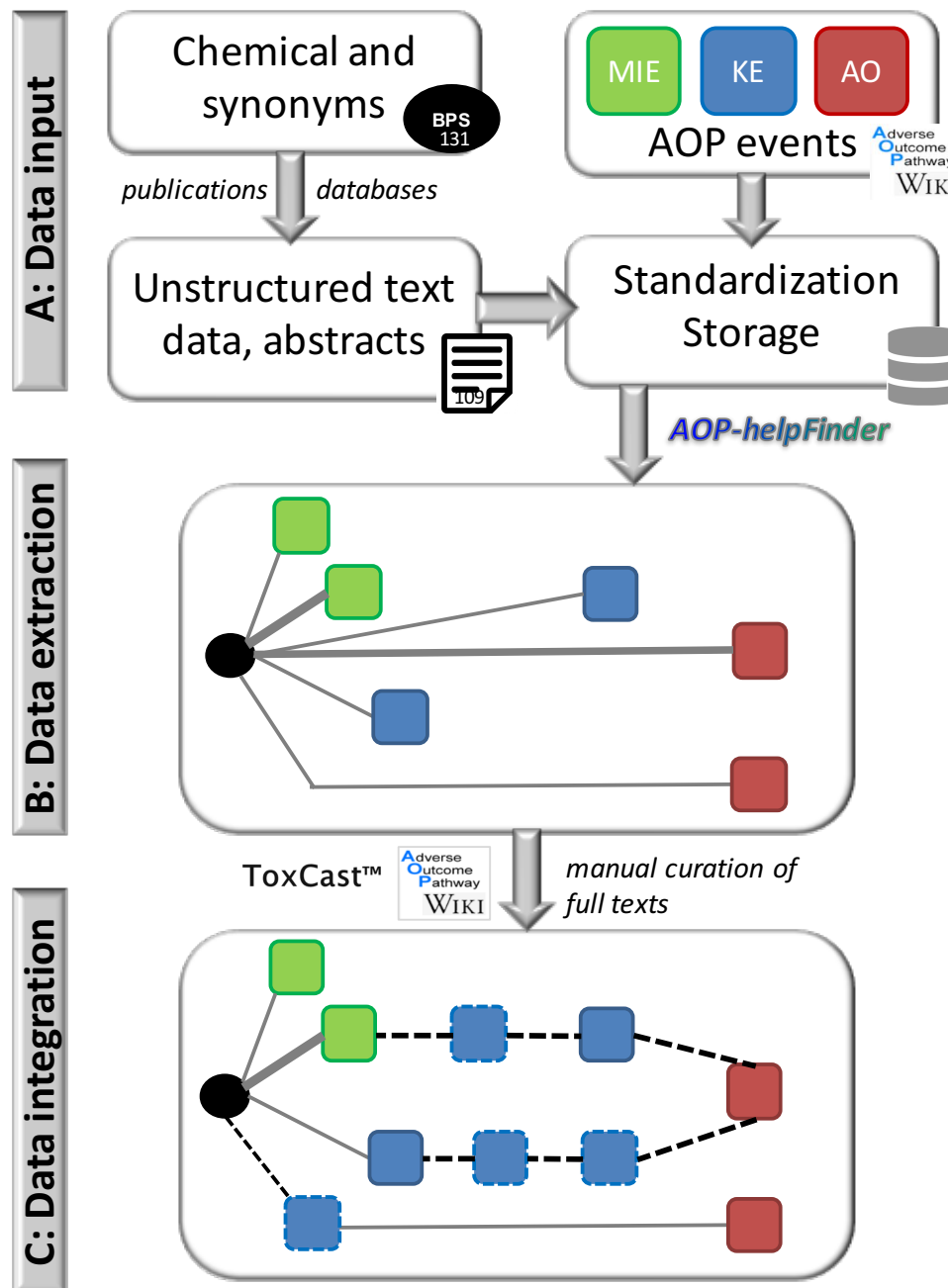
Modern toxicology: from chemical to AOP



Chemical to AOP : Strategy

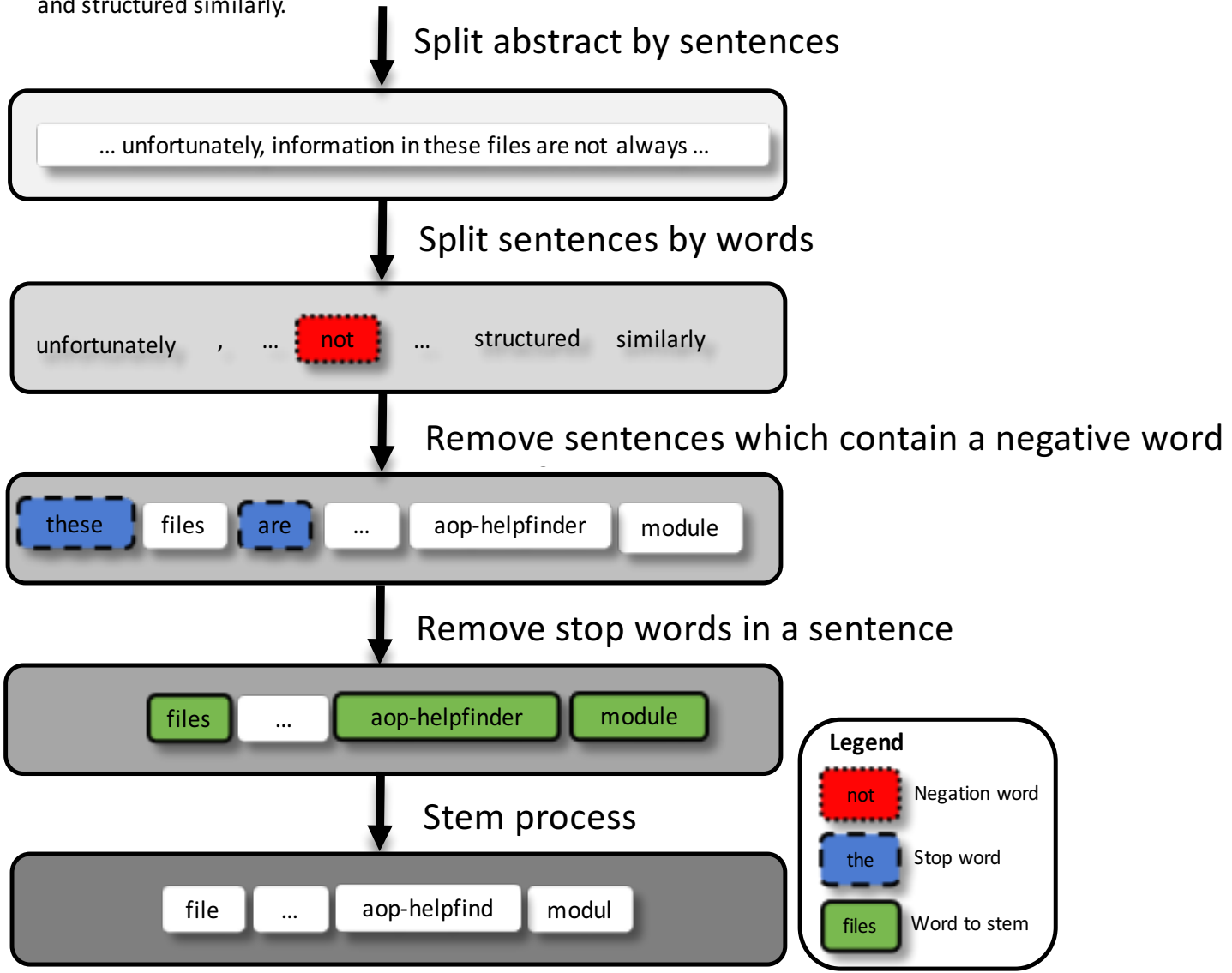


An integrated approach



AOP-helpFinder: data pre-processing

the request's result can be saved in a non free format file. these files are the basis and input of aop-helpfinder module. unfortunately, information in these files are not always organized and structured similarly.



AOP-helpFinder: text mining and scoring

BPS

It has been suggested that dramatic increase in obesity may be caused by environmental chemicals. *In vitro* data has suggested bisphenol S (BPS), a compound carbonate plastic production, can induce lipid accumulation in preadipocytes. How responsible for BPS-induced obesity *in vivo* remain unclear. In this study, we use (*Danio rerio*) larvae as a model to investigate the effect of environmentally relevant and 100 µg/L from 2 h to 15 d post fertilization) on lipid accumulation, triacylglycerol proteins content, and mRNA expression of genes involved in the regulation of lipid degradation, and storage. We also analyzed activities of two enzymes critical to protein lipase and diglyceride acyltransferase. Overfed, obese larvae were used a results indicated that BPS-treated and overfed larvae had much higher TAG 1 accumulation compared with control. BPS exhibited obesogenic effects by interfering with lipid metabolism as evidenced by (a) upregulation of the mRNA expression of *fasn*, *acc1*, and enzymes involved in the *de novo* synthesis of TAG in the liver, (b) downregulation of *scd1* expression, which should reduce TAG transport from the liver, and (c) increase in *scd1* expression should promote visceral fat accumulation. Our study is the first to demonstrate the effects of BPS in zebrafish are related to the disruption of TAG metabolism.

AOPs

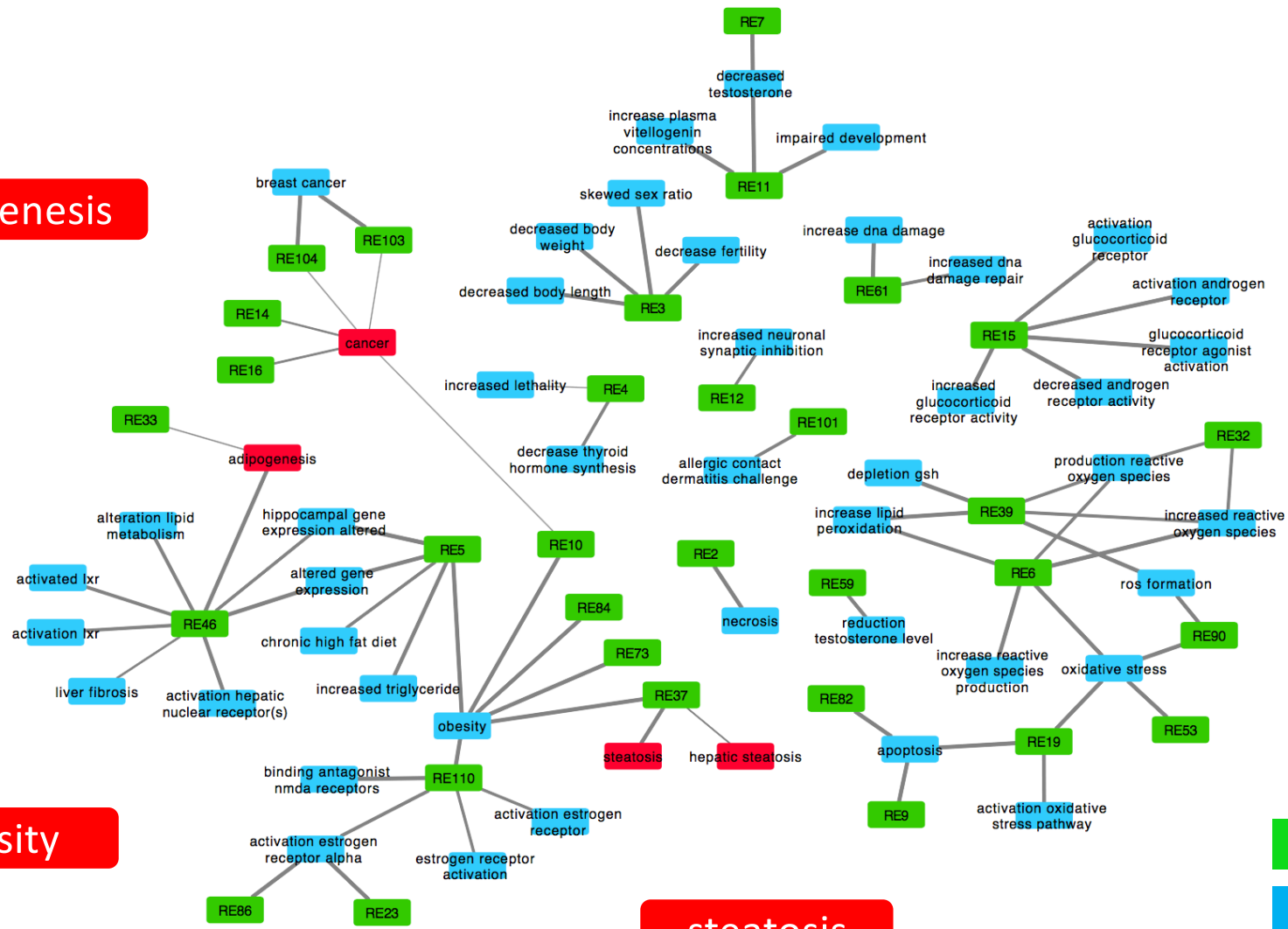
Scores:
Position score
Distance score

AOP-helpFinder: BPS

adipogenesis

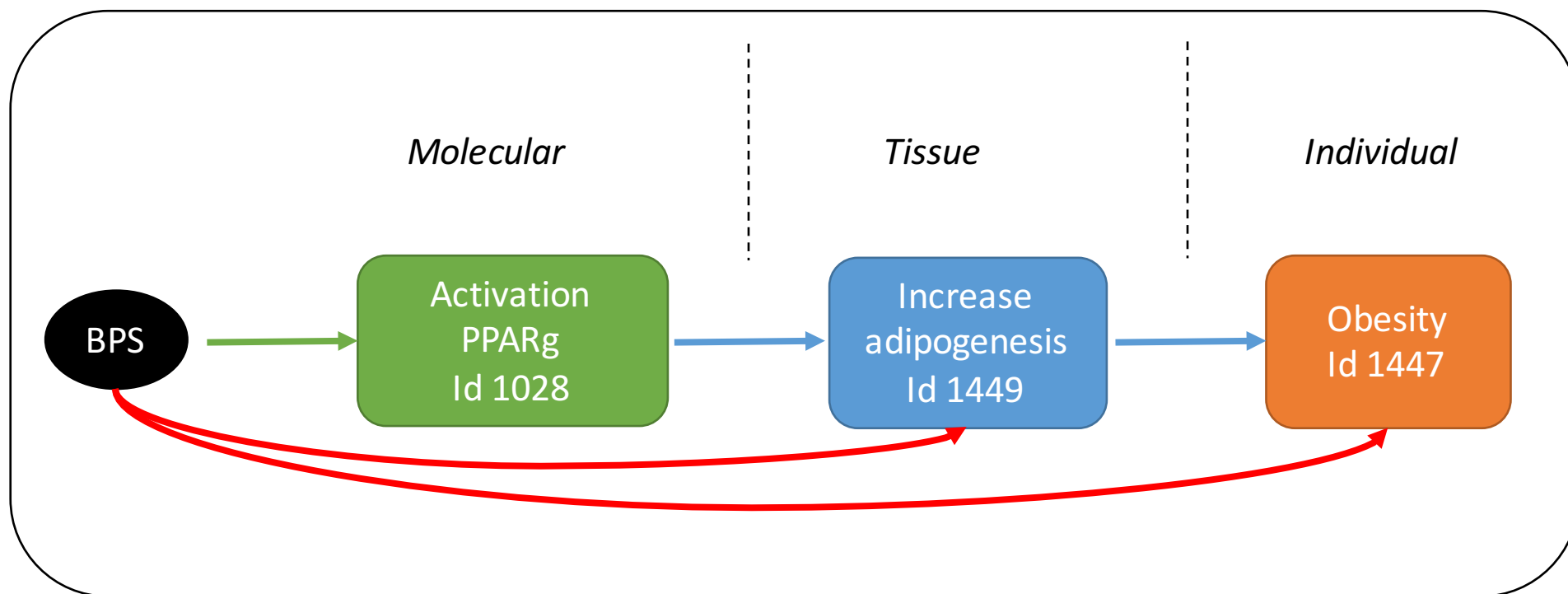
obesity




steatosis



31 References
44 MIE/KE
4 AO

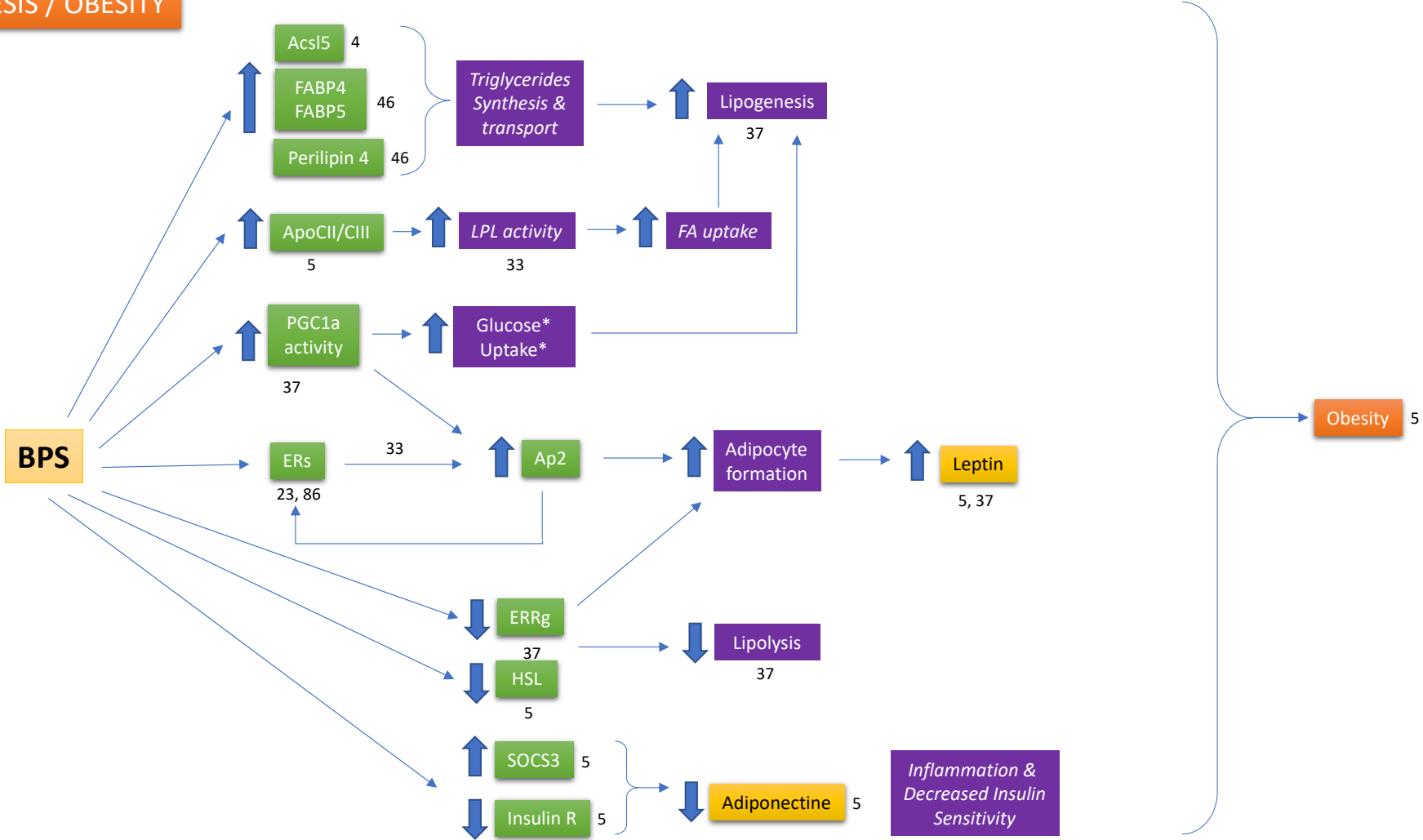
Integrative Systems Toxicology: BPS



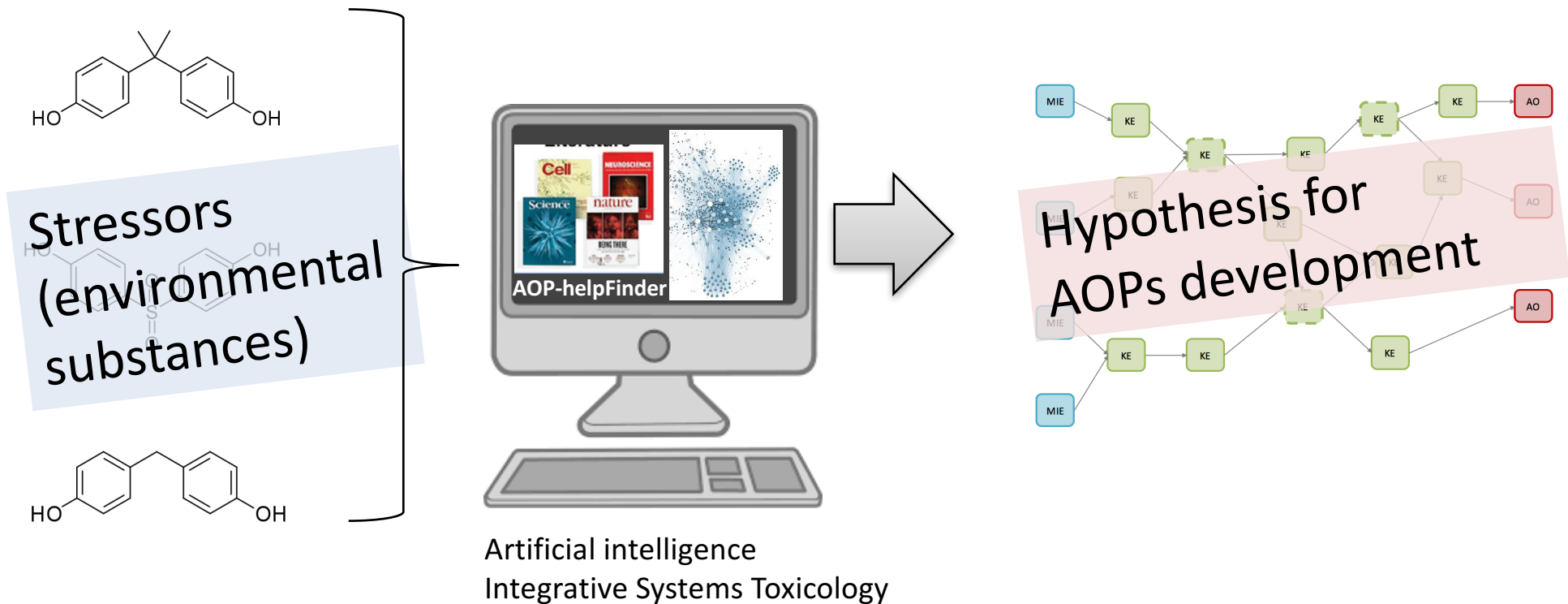
-  ToxCast
-  AOPwiki
-  AOPhelpFinder

Manual curation: BPS

ADIPOGENESIS / OBESITY



Conclusion



- rapid automatic screening
- complementarity to existing systems toxicology models
- increase our knowledges and may give orientation for further experimental analysis
- support the development of models that provide alternatives to animal testing

AOP-helpFinder availability

Linking bisphenol S to adverse outcome pathways using a combining text mining and systems biology approach. *Environmental Health Perspectives*. **2019**: 127(4)47005.

AOP-helpFinder version 1.0, downloadable on github

<https://github.com/jecarvaill/aop-helpFinder>

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