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# The long-term impact of antibiotic exposure in zebrafish bacterial communities

Ana Rita Almeida<sup>1</sup>, Marta Alves<sup>2</sup>, Inês Domingues<sup>1</sup> and Isabel Henriques<sup>3</sup>

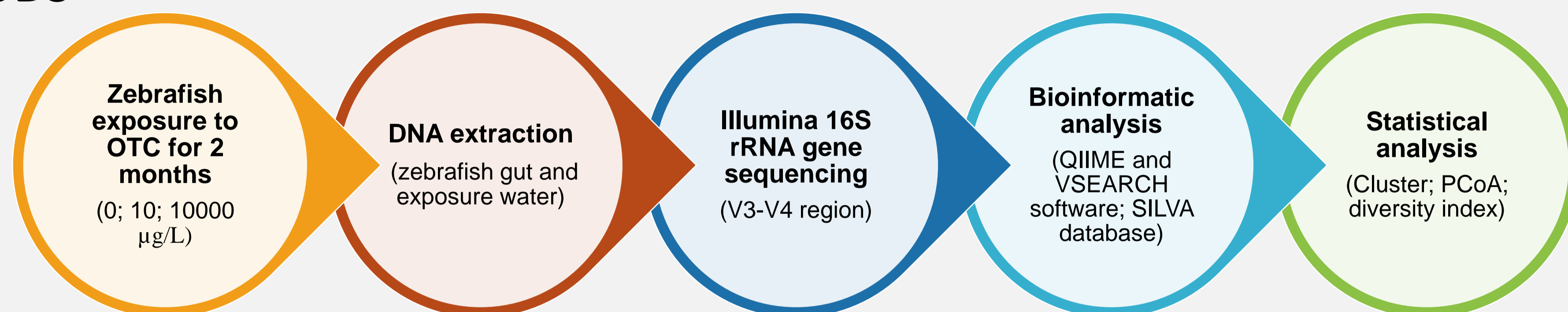
1 - Department of Biology & CESAM, University of Aveiro, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal

2 - CBQF – Centro de Biologia e Química Fina, Laboratório Associado, Escola Superior de Biotecnologia, Universidade Católica Portuguesa/Porto, Rua Dr. António Bernardino Almeida, 4200-072 Porto, Portugal

3 - CESAM & Department of Life Sciences, Faculty of Science and Technology, University of Coimbra, Calçada Martins de Freitas 3000-456 Coimbra, Portugal

rita.almeida@ua.pt

## METHODS



## RESULTS

### BACKGROUND

The interactions between the microbiome and its host have an important role in host' health [1]. Although antibiotics are useful for pathogens control in aquaculture, they may reshape aquatic animals' microbiome, disturbing hosts' welfare [2,3]. Antibiotics may also alter the microbiome of non-target animals and water bacterial communities. Due to its broad-spectrum activity, oxytetracycline (OTC) is one of the most frequently used antibiotics in aquaculture [4]. However, the impact that OTC may have in the microbiome of the fish and the surrounding water is poorly understood.

### OBJECTIVE

Study the long-term effect of OTC in zebrafish gut and water microbiome.

### References

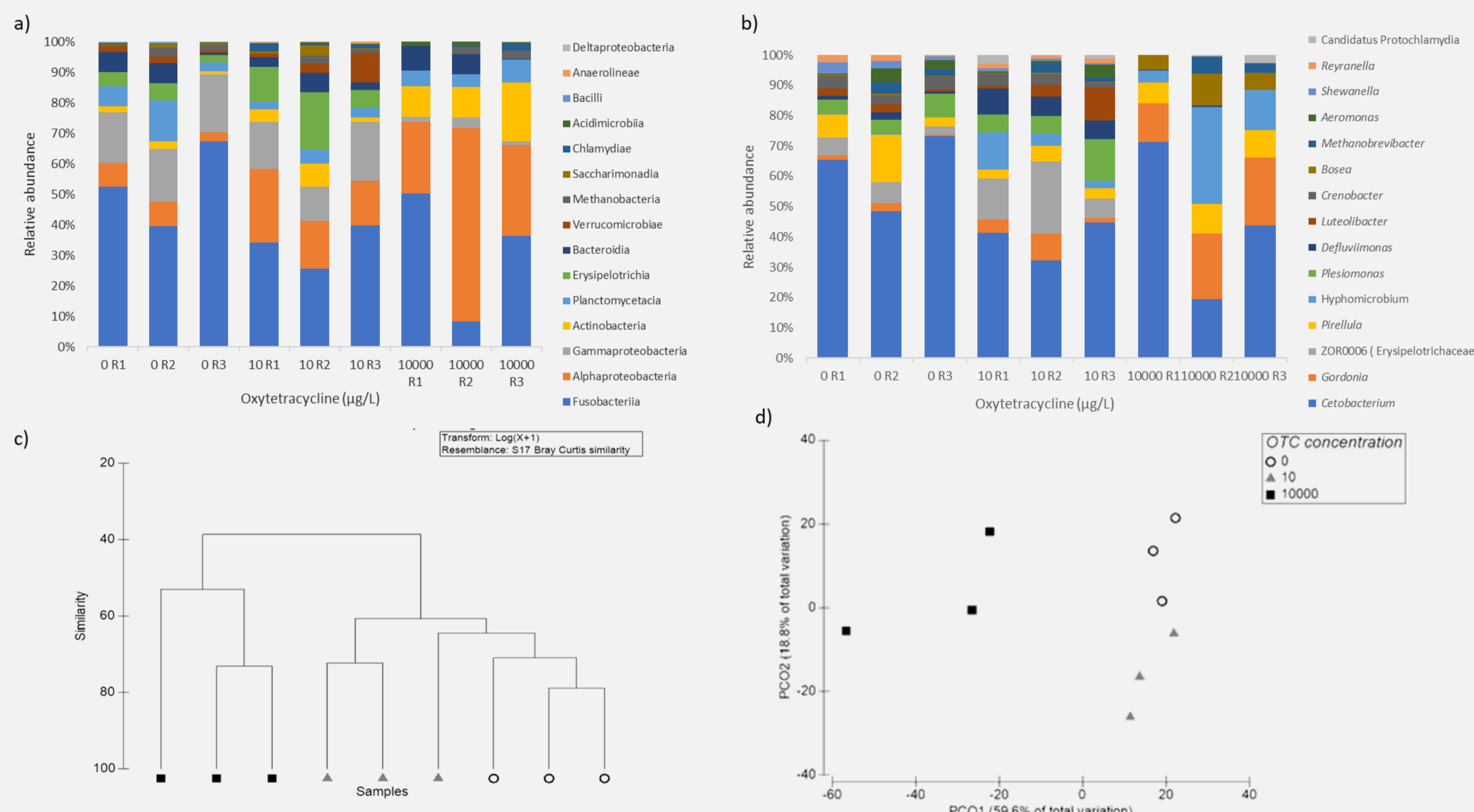
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### ACKNOWLEDGEMENTS

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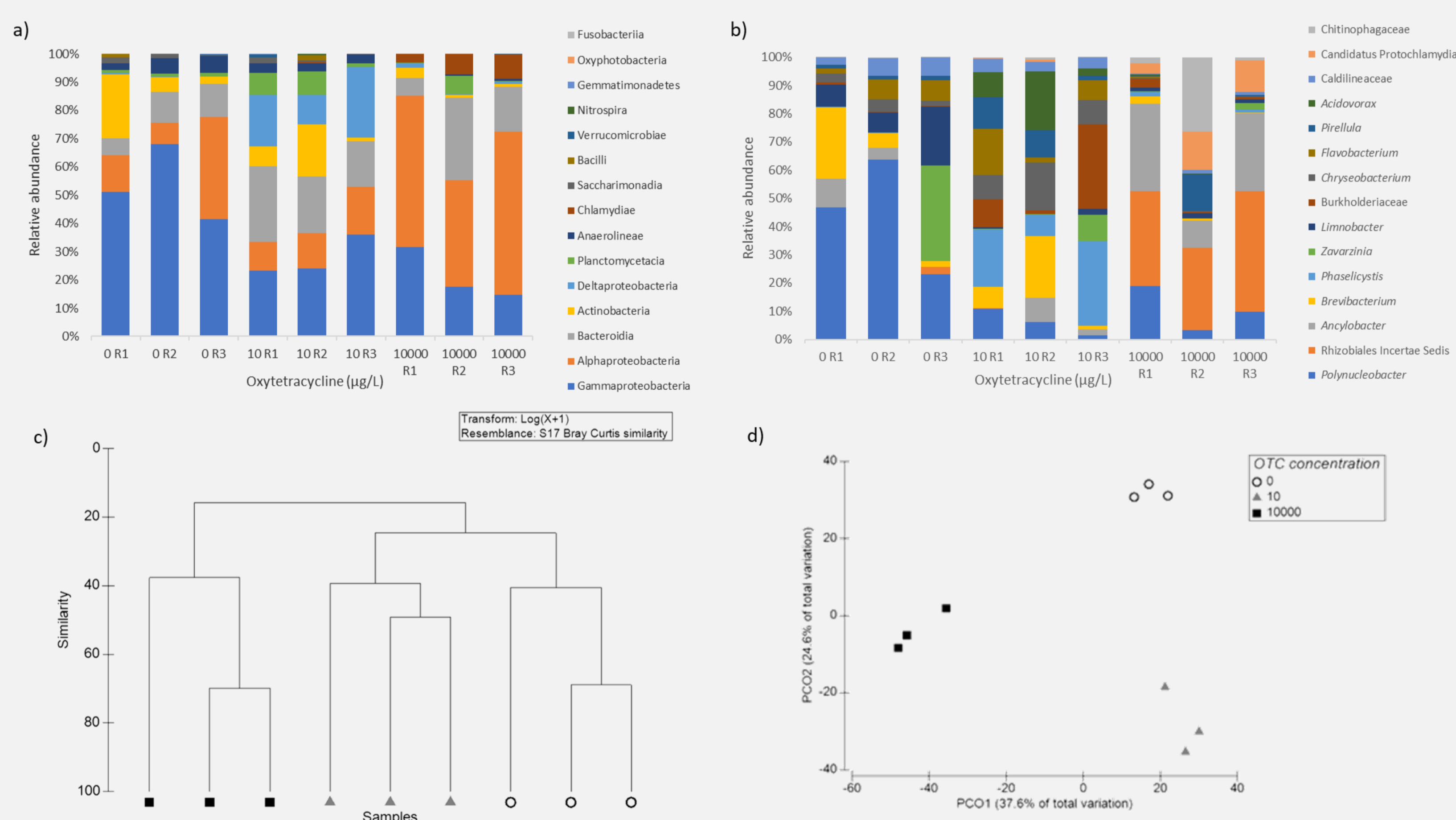


Zebrafish Gut microbiome



**Fig. 1:** Relative abundance of a) top 15 most abundant classes and b) top 15 most abundant genera of zebrafish gut microbiome exposed to OTC. The dendrogram c) and PCoA d) were based on Bray-Curtis similarity matrices of OTUs abundance table. Results of three replicates (R1, R2 and R3) are presented for control (0 µg/L) and for each OTC concentration (10 and 10000 µg/L).

Water microbiome



**Fig. 2:** Relative abundance of a) top 15 most abundant classes and b) top 15 most abundant genera of water microbiome exposed to OTC. The dendrogram c) and PCoA d) were based on Bray-Curtis similarity matrices of OTUs abundance table. Results of three replicates (R1, R2 and R3) are presented for control (0 µg/L) and for each OTC concentration (10 and 10000 µg/L).

**Table 1:** Species richness (number of OTU; S), diversity (Shannon-Wiener index; H') and evenness (Pielou's evenness index; J) indexes of the zebrafish gut and water bacterial communities exposed to different concentrations of oxytetracycline (OTU based profile). Values presented per mean ± standard deviation. Asterisks (\*) indicates differences towards the respective control (p < 0.05; Dunnett's test).

Samples	Oxytetracycline (µg/L)	Species richness (S)	Shannon - Wiener diversity index (H')	Pielou's evenness index (J)
Zebrafish gut	0	287 ± 56.93	2.83 ± 0.39	0.50 ± 0.07
	10	294 ± 34.04	3.19 ± 0.17	0.56 ± 0.04
	10000	248 ± 26.35	2.99 ± 0.21	0.51 ± 0.03
Water	0	279 ± 17.06	2.49 ± 0.17	0.44 ± 0.03
	10	358 ± 60.58	3.31 ± 0.37*	0.56 ± 0.05*
	10000	346 ± 21.83	2.89 ± 0.35	0.49 ± 0.06

## CONCLUSIONS

- Overall, the OTC impacted both water and gut bacterial communities' structure.
- Effects on water bacterial communities were observed even for the lowest (10 µg/L) OTC concentration with the abundance increase of Deltaproteobacteria, while in zebrafish gut effects were observed only in the highest (10000 µg/L) concentration tested, with the increase of Actinobacteria and Alphaproteobacteria abundance.
- In both water and zebrafish gut microbiome was observed a decrease of Gammaproteobacteria (e.g. *Shewanella*) resulting from OTC exposure (10000 µg/L).
- Diversity and evenness slightly increased only in water samples exposed to 10 µg/L of OTC.