

MICROPLASTIC EXPOSURE AND EFFECT ON LOGGERHEAD TURTLE

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CONTEXT & OBJECTIVES

The abundance of MNPs (plastic particles measuring < 5mm) in marine environments poses an emerging threat to the global health of ecosystems and organisms throughout the globe. Given their microscopic sizes and ubiquity, MPs are typically absorbed by a large array of organisms, disseminating and bioaccumulating in all tissues and interfering with all biological functions.

The present study aims to:

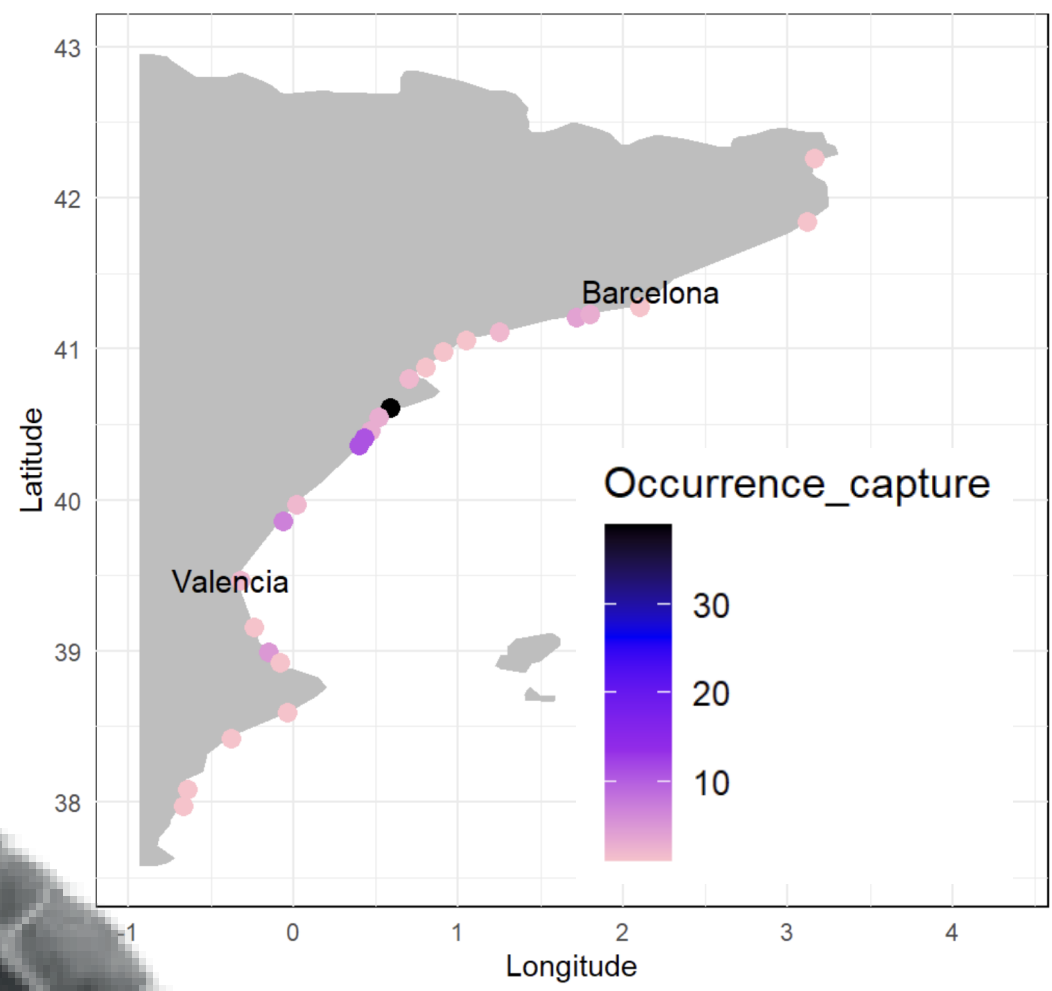
- quantify and characterize the MP contamination in loggerhead turtles (*Caretta caretta*).
- measure MP impact on the gut microbiota and health indices of loggerhead turtles of the western Mediterranean.

METHODS



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114 Turtles sampled



Scales

Chronic stress
-Corticosteron

Faeces & cloacal swabs

-Microplastics (MPs)
-Gut Microbiota
-Cloacal microbiota

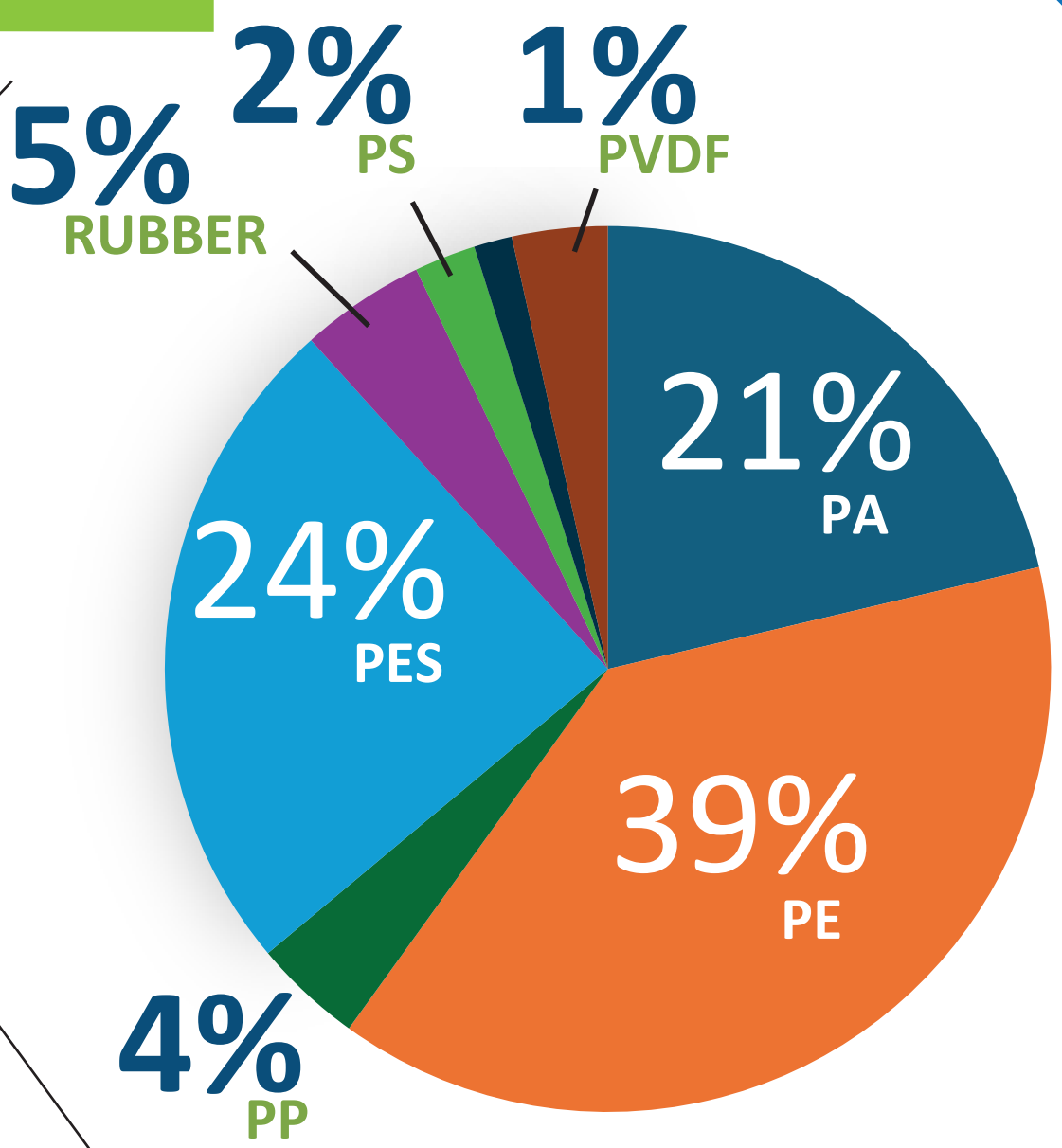
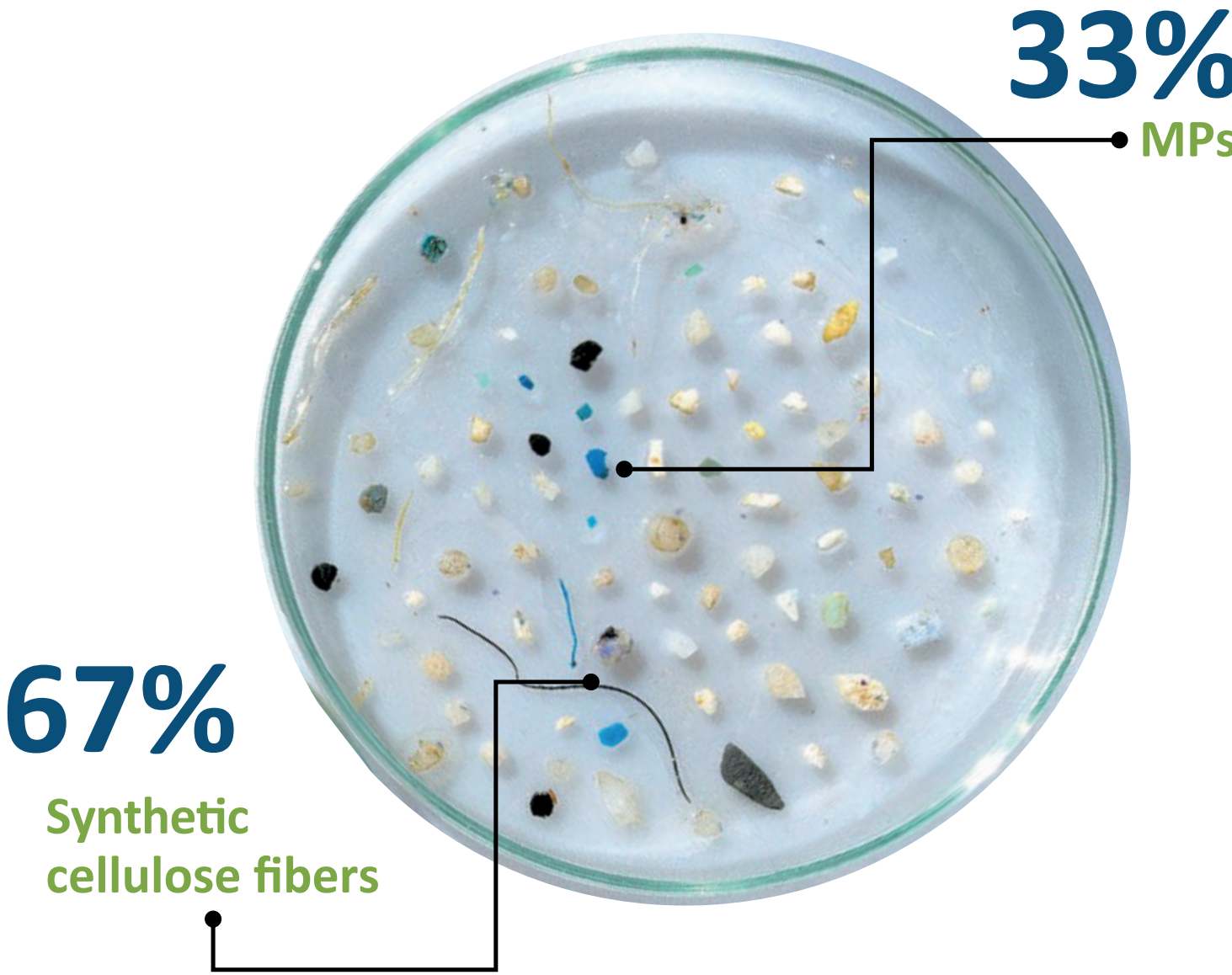
External parasitosis

Blood

Immune response
-Differential blood count
Markers of tissue damage
-CPK, LDH, AST, troponin
Liver metabolism
-PAL
Pancreatic metabolism
-Amylase, Lipase
Lipidic metabolism
-Cholesterol

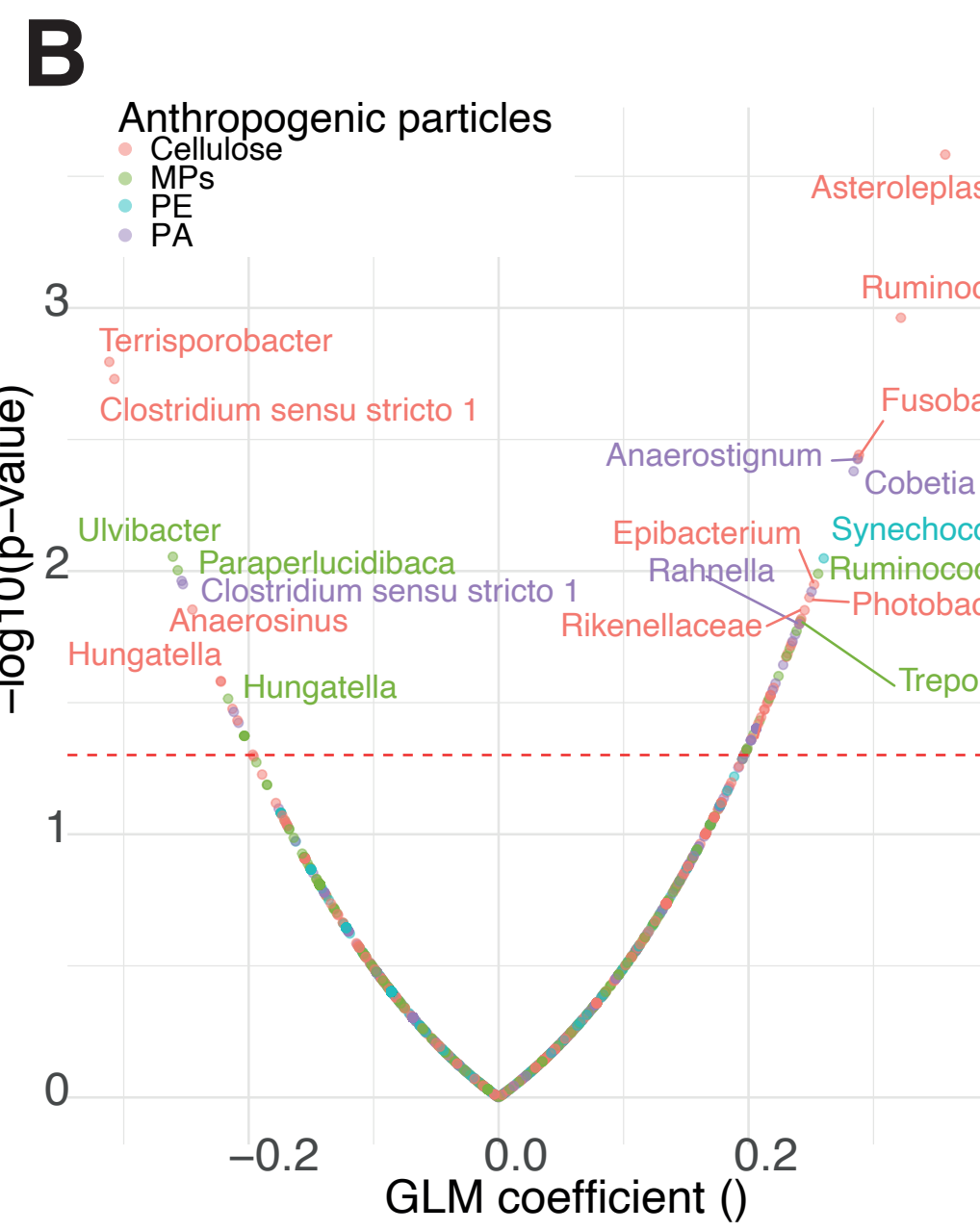
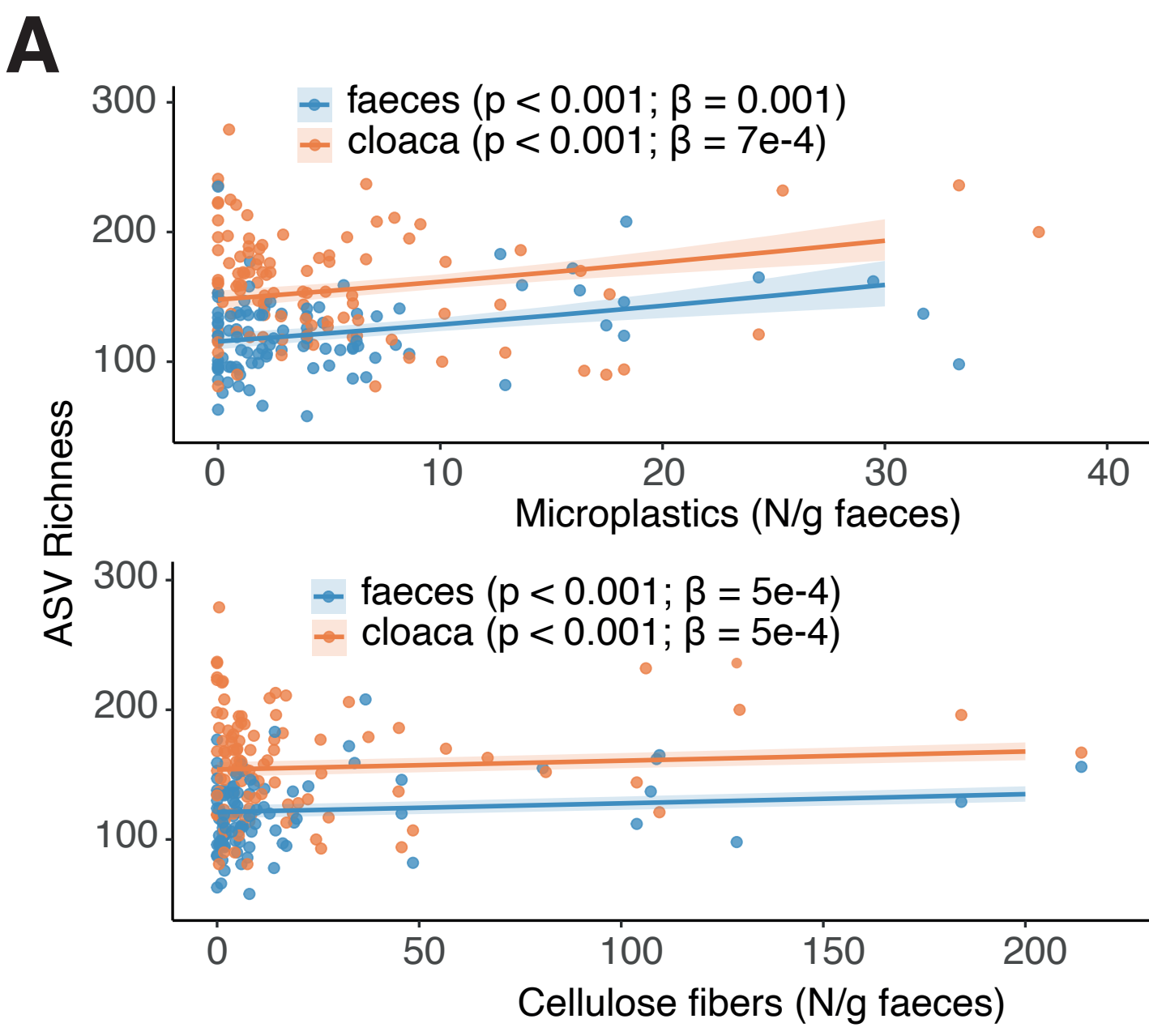
MPs ABUNDANCE & COMPOSITION

73% of the turtles have anthropogenic particles in their gut



MP concentrations average 7.9 particles / g of faeces

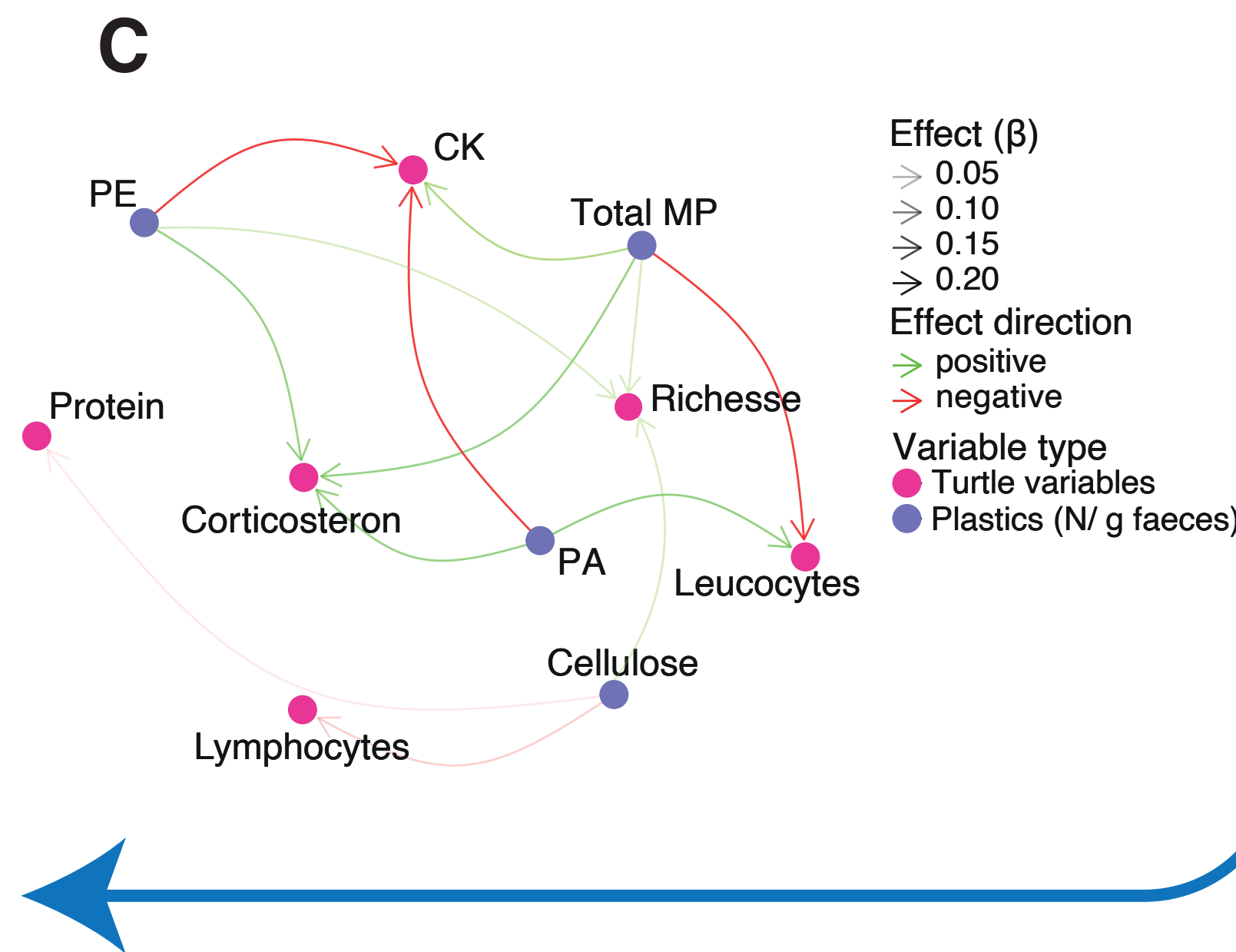
EFFECT ON MICROBIOTA



- Using generalized linear models (GLMs), we showed that the richness of the **faecal and cloaca microbiota** were **significantly positively related to MP and cellulose fiber concentrations** (A)
- Similarly, MP and cellulose fiber concentrations had a significant effect **on the beta diversity** of the faecal and cloaca microbiota. Turtles with greater MPs or cellulose fibers **were significantly enriched** in microbial lineages such as *Fusobacterium* which are **potential pathogens** (B)

EFFECT ON TURTLE BIOLOGY

- Significant relationships between MPs / synthetic cellulose fibers and health indices of turtles are represented in a bipartite network (C). Both total and specific MPs were significantly related to several health indices such as corticosteron concentrations, leucocytes abundance and creatine kinase (CK) levels.



Conclusion

To summarize, we found that ingested microplastics as well as synthetic cellulose fibers appear capable of affecting the microbiota, the stress level and the immune system of loggerhead turtles, potentially affecting their health.

The implications are significant: humans are also exposed to micro- and nanoplastics, prompting concerns about the potential impact of plastic ingestion on human health, particularly gut health.