

The absorption of microdebris in reef-building corals

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Introduction

The pollution of the oceans is increasing and especially microplastics (0.1–5 mm) have been detected in nearly every marine environment. It has been shown that reef-building corals may overgrow microplastic particles or embed them in their skeletons after ingestion¹. Also, particles can be trapped on the coral surface². Most studies that experimentally investigate the effects of microplastics are focusing on a single type of plastic (e.g., polyethylene), but little is known about the effects of naturally occurring mixtures, called “marine microdebris”.

Preliminary work

We exposed two reef-building coral species (*S. pistillata* and *P. verrucosa*) in an 8-week laboratory experiment to three different mixtures of microdebris and one single polymer, each with a concentration of 200 particles per liter.

Stylophora pistillata



Pocillopora verrucosa



Fibers

Artificial fibers from customary clothes, i.e., acrylic, polyamide, and polyester

Beach

Mixture of secondary marine microplastics, composed of fragmented plastic debris³

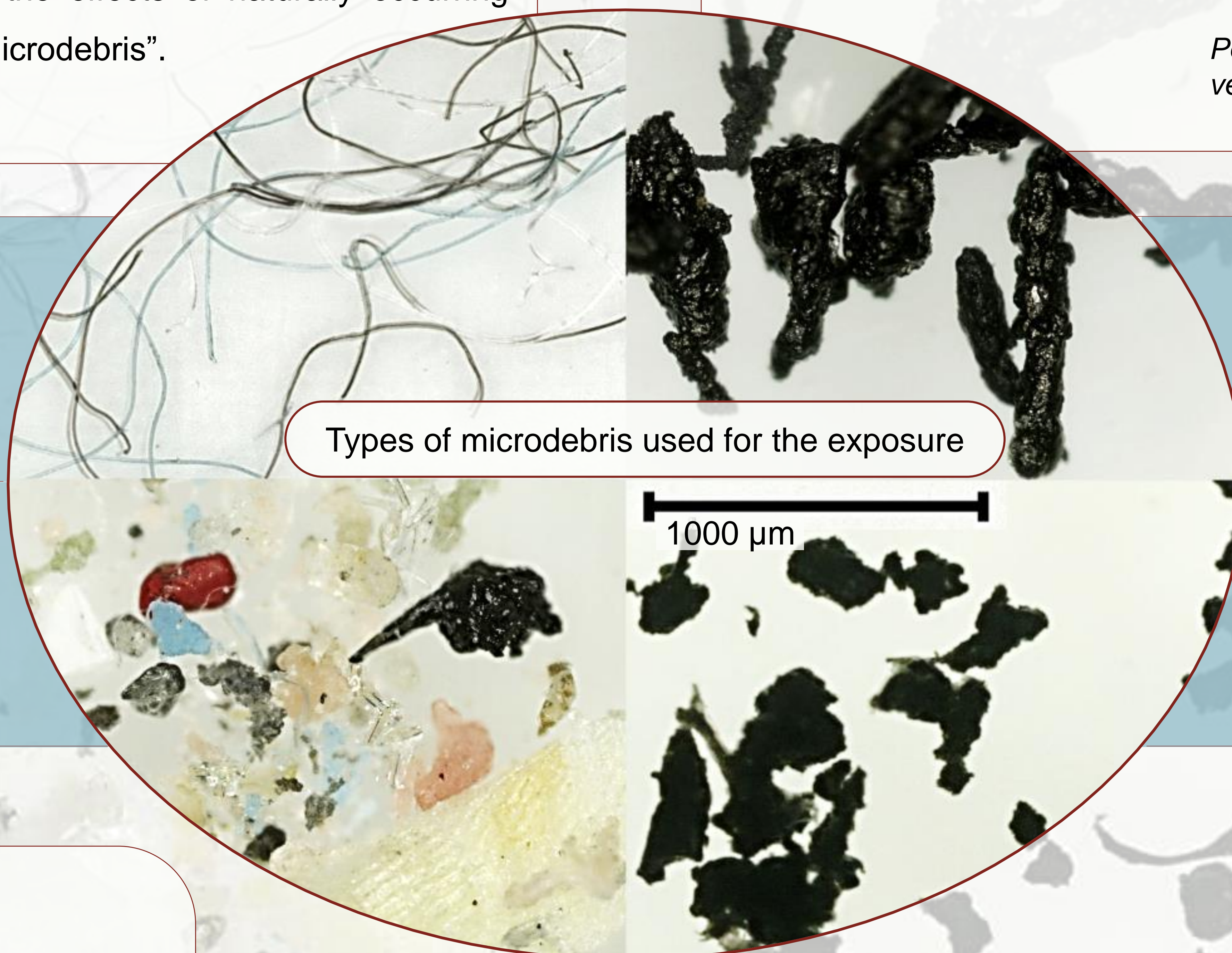
Tirewear

Residues from the automobile sector⁴, i.e., tire wear, brake abrasion, and varnish

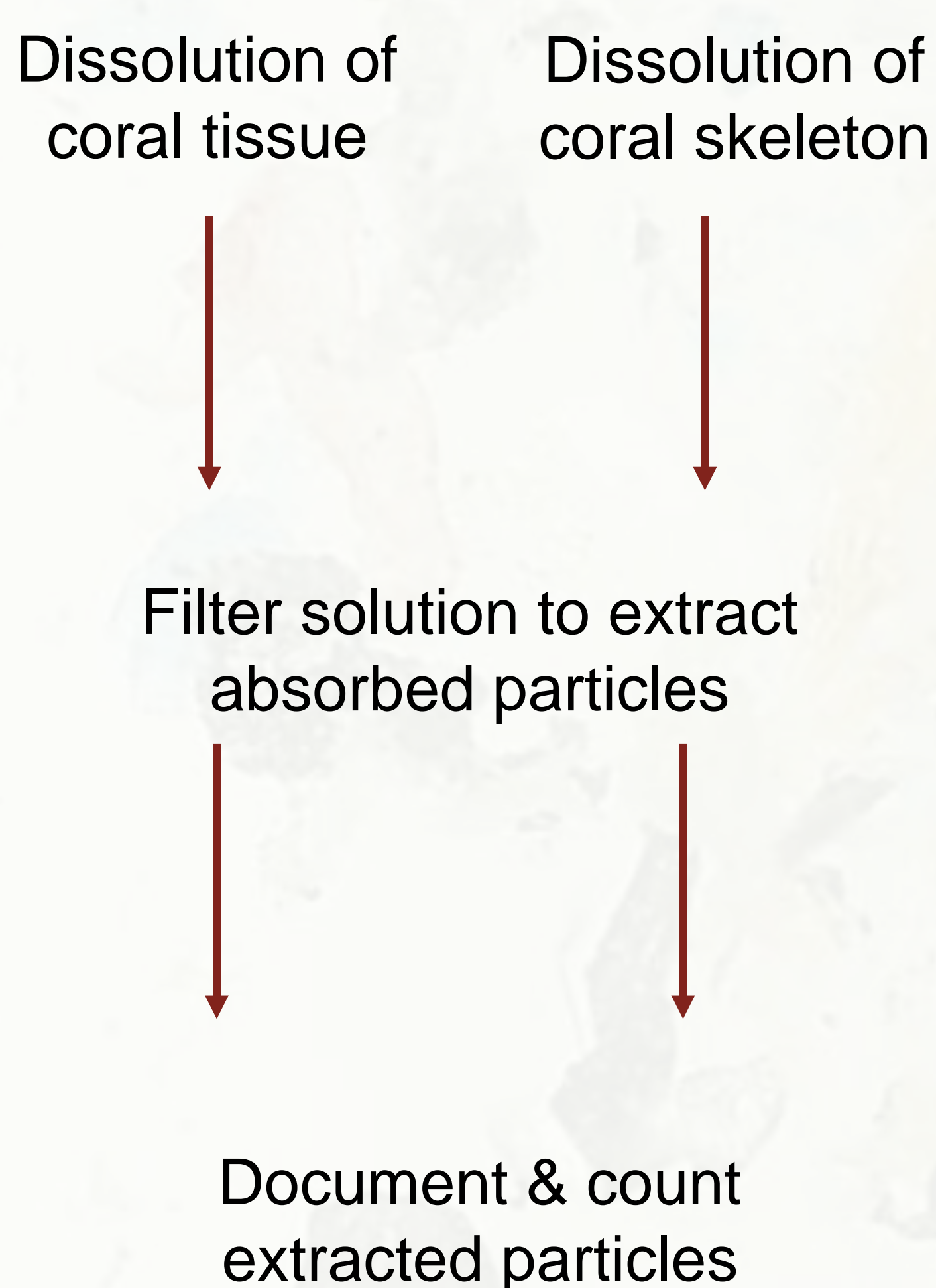
PE

High-density polyethylene particles from the industry⁵

Types of microdebris used for the exposure



Project plan



Example of a dissolved, filtered coral tissue containing PE

Research questions

- Which microdebris types might be most prone to be absorbed by corals?
- Is there a difference between the quantity of absorption of these mixtures in the tissue or the skeleton?
- In what way can coral reefs act as a sink for naturally occurring marine microdebris?

Literature:

- 1: REICHERT, J. ET AL. 2017: RESPONSES OF REEF BUILDING CORALS TO MICROPLASTIC EXPOSURE, ENVIRONMENTAL POLLUTION 237 (2018) 955-960
- 2: MARTIN, C. ET AL. 2019: ADHESION TO CORAL SURFACE AS A POTENTIAL SINK FOR MARINE MICROPLASTICS, ENVIRONMENTAL POLLUTION 255 (2019) 113281

Sources:

- 3: KÜHN, S. ET AL. 2018: MARINE MICROPLASTIC: PREPARATION OF RELEVANT TEST MATERIALS FOR LABORATORY ASSESSMENT OF ECOSYSTEM IMPACTS, CHEMOSPHERE 213 (2018) 103-113
- 4: EKS-KARTCENTER-COLOGNE GMBH
- 5: NOVOPLASTIK, GERMANY