



10th SIBE CONGRESS

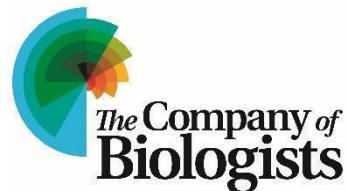
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Functional redundancy in microbial ecosystems

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A healthy ecosystem is generally characterized by the stable performance of essential ecological functions, which are typically supported redundantly by multiple species. Although the concept of functional redundancy is well-established in macroecology, estimating redundancy in microbial communities remains challenging and has thus been only partially explored. In this study, we aim to quantify the redundancy within the complex community of microorganisms in the gastrointestinal tract to predict the risk of functional loss in the human gut microbiome, thereby assessing the potential risk of dysbiosis. We specified a diversity-based redundancy index and applied it to metagenomics samples from obese patients before and after bariatric surgery. We observed a general increase in functional redundancy 12 months after bariatric surgery for nearly all functions showing significant differences. Our findings support the assumption that a high level of redundancy is typically associated with a healthier microbiome, thereby highlighting the importance of functional redundancy as a key biodiversity metric for microbiome stability and resilience.