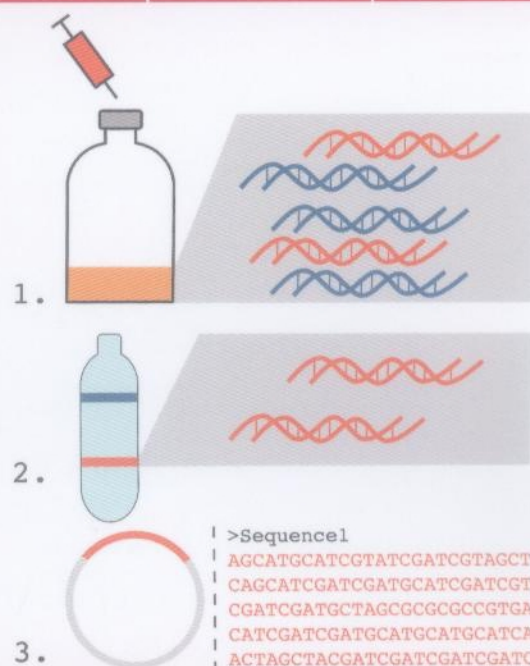


Jan van der Meer & Greg N Stephanopoulos, Editors



October 2016

Analytical biotechnology

Edited by Hans-Hermann Richnow and Tillmann Lueders

December 2016 Chemical biotechnology • Pharmaceutical biotechnology

February 2017 Analytical biotechnology

April 2017 Food biotechnology • Plant biotechnology

June 2017 Energy biotechnology • Environmental biotechnology

August 2017 Systems biology • Nanobiotechnology



ELSEVIER

CONTENTS

Abstracted/indexed in: BIOSIS, CAB Abstracts International, CAB Health, Chemical Abstracts, EMBASE, Index Medicus, Medline. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®

- iv **Hans-Hermann Richnow and Tillmann Lueders**
Editorial overview: Probing environmental processes and microbiome functions using stable isotopes as smart tracers in analytical biotechnology

Analytical biotechnology

Edited by Hans-Hermann Richnow and Tillmann Lueders

- 1 **Sara Coyotzi, Jennifer Pratscher, J Colin Murrell and Josh D Neufeld**
Targeted metagenomics of active microbial populations with stable-isotope probing
- 9 **Feth el Zahar Haichar, Thierry Heulin, Julien P Guyonnet and Wafa Achouak**
Stable isotope probing of carbon flow in the plant holobiont
- 14 **Egbert Schwartz, Michaela Hayer, Bruce A Hungate, Benjamin J Koch, Theresa A McHugh, William Mercurio, Ember M Morrissey and Katerina Soldanova**
Stable isotope probing with ^{18}O -water to investigate microbial growth and death in environmental samples
- 19 **Lorenz Adrian and Ernest Marco-Urrea**
Isotopes in geobiochemistry: tracing metabolic pathways in microorganisms of environmental relevance with stable isotopes
- 26 **Nico Jehmlich, Carsten Vogt, Vanessa Lünsmann, Hans Hermann Richnow and Martin von Bergen**
Protein-SIP in environmental studies
- 34 **Yun Wang, Wei E Huang, Li Cui and Michael Wagner**
Single cell stable isotope probing in microbiology using Raman microspectroscopy
- 43 **Gunter Wegener, Matthias Y Kellermann and Marcus Elvert**
Tracking activity and function of microorganisms by stable isotope probing of membrane lipids
- 53 **Hannah K Marchant, Wiebke Mohr and Marcel MM Kuypers**
Recent advances in marine N-cycle studies using ^{15}N labeling methods
- 60 **Martin Elsner and Gwenaél Imfeld**
Compound-specific isotope analysis (CSIA) of micropollutants in the environment – current developments and future challenges

- 73 **Matthias Kästner, Karolina M Nowak, Anja Miltner and Andreas Schäffer**
(Multiple) Isotope probing approaches to trace the fate of environmental chemicals and the formation of non-extractable 'bound' residues
- 83 **Tillmann Lueders, Marc G Dumont, Lauren Bradford and Mike Manefield**
RNA-stable isotope probing: from carbon flow within key microbiota to targeted transcriptomes
- 90 **Carsten Vogt, Conrad Dorer, Florin Musat and Hans-Hermann Richnow**
Multi-element isotope fractionation concepts to characterize the biodegradation of hydrocarbons – from enzymes to the environment
- 99 **Anko Fischer, Mike Manefield and Petra Bombach**
Application of stable isotope tools for evaluating natural and stimulated biodegradation of organic pollutants in field studies
- 108 **Ivonne Nijenhuis and Hans H Richnow**
Stable isotope fractionation concepts for characterizing biotransformation of organohalides
- 114 **Niculina Musat, Florin Musat, Peter Kilian Weber and Jennifer Pett-Ridge**
Tracking microbial interactions with NanoSIMS
- 122 **Martin Blaser and Ralf Conrad**
Stable carbon isotope fractionation as tracer of carbon cycling in anoxic soil ecosystems
- 130 **Haibo Jiang, Matthew R Kilburn, Johan Decelle and Niculina Musat**
NanoSIMS chemical imaging combined with correlative microscopy for biological sample analysis

The cover

The DNA stable-isotope probing (DNA-SIP) method begins by incubating environmental samples with an isotopically labelled growth substrate (1). Subsequently, heavy DNA can be recovered by density gradient ultracentrifugation (2). Metagenomic analysis of labelled DNA enables targeted access to genomes from uncultivated microorganisms that are responsible for assimilating substrates of interest (3). (See Sara Coyotzi, Jennifer Pratscher, J Colin Murrell, Josh D Neufeld, pages 1–8, this issue)