



# Microbial Community Composition of Wadden Sea Sediment as Revealed by Fluorescence In Situ Hybridization with Catalyzed Reporter Deposition (CARD-FISH)



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## Introduction

FISH method has been used to enumerate microbial communities in sediment. However, relatively low detection rates of FISH suggest substantial existence of missing organisms. Therefore recent developed more sensitive FISH method was applied for the detection and enumeration of sediment microbial communities for a better understanding of tidal flat systems.

### Points of optimization

- Inactivation of endogeneous peroxidase activities
- Examination of cell wall permeability of *Planctomycetes* and Archaea

## Conclusions

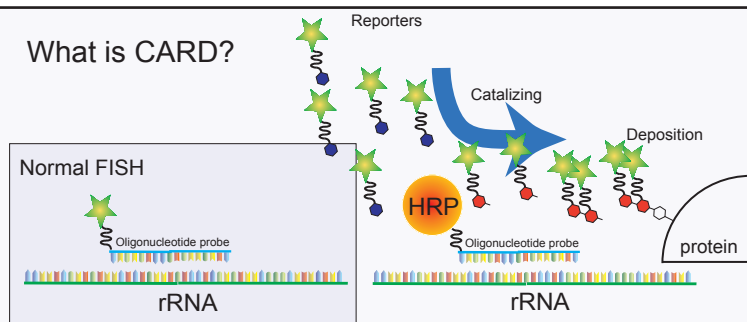
With an optimized CARD-FISH protocol, microbial communities can be reliably detected.

- Detection of *Planctomycetes* and Archaea.
- Higher detection rates.
- Detection of microbes also in deeper horizons.
- Detection of infrequent populations.

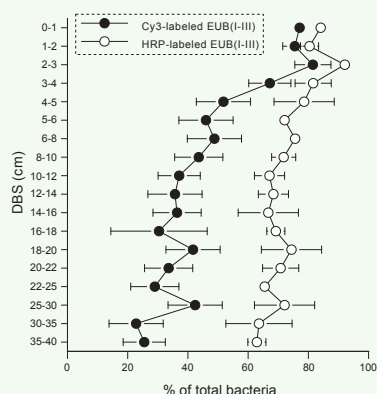
Two types of depth distribution were observed:

- (i) distributed over the depth; CF319, Pla886, Gam42a and Bet42a.
- (ii) distributed only in upper layers; Alf968 and DSR651.

## What is CARD?

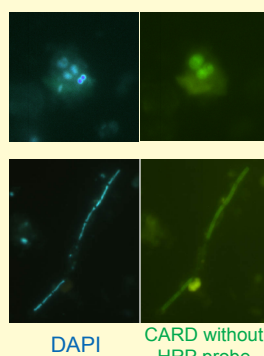


### Comparison between CARD-FISH and normal-FISH

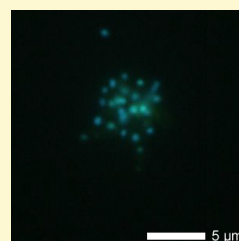


higher detection rates of CARD-FISH

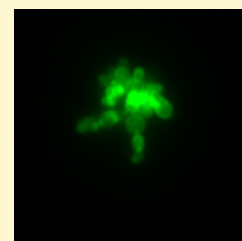
### Endogeneous peroxidase activity



## CARD-FISH to organisms with unusual cell walls

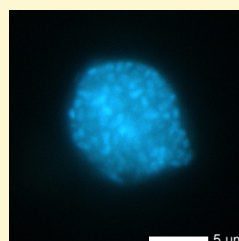


DAPI

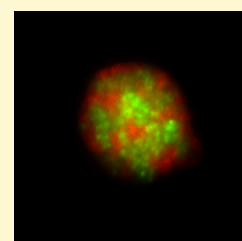


Pla886

*Pirellula* sp. SL 1 (proteinaceous cell wall)



DAPI



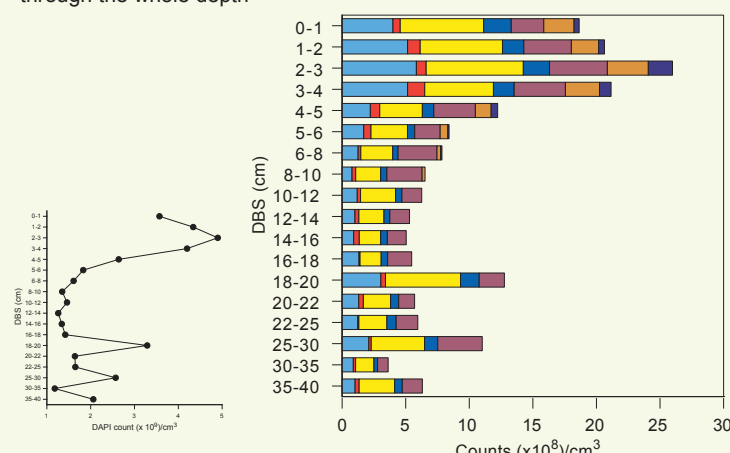
Arch915 Dss658

Aggregate containing Archaea  
(unknown cell wall composition)

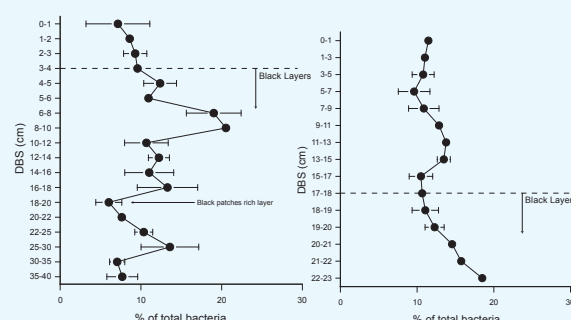
Very low abundance  
(approx. 2 aggregates/10<sup>5</sup> procaryotic counts)

## CARD-FISH with group specific probe

High abundances of Gam42a and Dss658 targeted organisms through the whole depth



### Different depth distribution of DSS658 targeted cells



September 2002 samples  
containing muddy black patches

March 2002 samples  
entirely sandy