



## Fate of peptidoglycan in an intertidal sediment: An in situ $^{13}\text{C}$ -labeling study

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**ABSTRACT:** We investigated the fate of peptidoglycan, a bacterial cell wall component, in sediment by  $^{13}\text{C}$ -labeling the bacterial community of an intertidal mudflat and subsequently tracing the fate of  $^{13}\text{C}$  in D-alanine (D-Ala, a bacterial biomarker specific for peptidoglycan), bacteria-specific phospholipid-derived fatty acids (PLFAs, specific for cell membranes of living bacteria), and total hydrolysable amino acids (THAAs, representing bulk proteinaceous material) over a 4.5-month period in situ. Results showed a relatively slow loss of  $^{13}\text{C}$  from D-Ala (half lives of 20-67 d) compared with that from bacteria-specific PLFAs (half lives of 13-33 d) during the sampling period and a relatively strong retention of  $^{13}\text{C}$  in D-Ala compared with the other compounds after 4.5 months. This provides direct in situ evidence for relative accumulation of peptidoglycan during reworking and degradation of bacterial biomass in sediments. Degradation also resulted in compositional changes of the [ $^{13}\text{C}$ ]THAA pool, including increased relative abundances of glycine, serine, and proline.

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