In-mouth metabolism and production of flavor sulfur compounds by oral microbiota enzymes

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Abstract {Max words limit 250}

Flavor perception is the main factor in the acceptance of food. Cysteine derivatives are aroma precursors present in a number of plant-based foods (vegetables, fruits, as well as beverages such as wine). They have low odorant properties, but become odorant when metabolized into aroma sulfur compounds in the oral cavity. These sulfur compounds are sometimes associated with food aversion. Therefore, it is desirable to improve our knowledge of the entailed enzymatic mechanisms and design strategies aiming at controlling their release in-mouth. The involved enzymes are presumably carbon-sulfur lyases (C-S lyases) from the oral microbiota, but evidences are scarce. Recently, we showed that saliva metabolizes allyl-cysteine into odorant sulfur metabolites, with evidence suggesting that pyridoxal phosphate-dependent C-S lyases are involved. Protein sequence analysis of C-S lyases in *Fusobacterium nucleatum* was carried out and led to the identification of several putative targets. The C-S lyase FnaPatB1 from *F. nucleatum animalis*, showed high activity with a range of aroma precursors. FnaPatB1 metabolizes cysteine derivatives within a unique active site environment that enables the formation of flavor sulfur compounds. Among a food compounds library, we identified several inhibitors able to reduce the C-S lyase activity of FnaPatB1 in vitro, which paves the way for controlling the release of odorant sulfur compounds from their cysteine precursors in the oral cavity.

Biography: {Max words limit 100}

Mathieu Schwartz is a young researcher working in the field of flavor biochemistry and in-mouth enzymatic mechanisms leading to flavor release and flavor perception. After obtaining a PhD in chemistry and a post-doc in biochemistry, he was appointed young permanent researcher at the Center for Taste and Feeding Behavior at INRAE (Dijon, France). Methodologies involve in vivo/ex vivo studies, flavor chemistry as well as in vitro studies on proteins using advanced biochemistry and structural biology tools. He is currently leading a research project tackling the relationships between oral microbiota enzymes and flavor release and perception from aroma precursors.