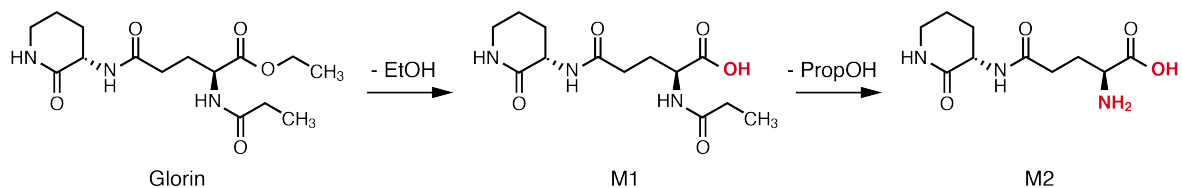


Master thesis project:

Metabolism of the secreted signaling molecule glorin in social amoebae

Dictyostelia are soil-dwelling amoeboid cells that are characterized by a facultative “social” phase, in which single cells cooperate to form a multicellular organism that transforms into fruiting bodies that can spread dormant spores to places with sufficient food supply. The multicellular phase starts with the chemotactic migration of single cells in gradients of secreted signaling molecules known as “acrasins”. If an acrasin mediates aggregation of single amoebae to form multicellular structures, it would be expected that cells are able to (i) secrete this acrasin, (ii) migrate in gradients of the acrasin, and (iii) secrete an enzyme that degrades the acrasin to an inactive metabolite. It is known that the acrasin used by the amoeba *Polysphondylium violaceum* is a modified dipeptide called glorin.

In previous studies we have identified more than 40 species of social amoebae that secrete a glorinase (the enzyme that degrades glorin), suggesting that a glorin-based communication system is widespread in the social amoebae and may even represent the most ancient communication system in these organisms. Glorinase removes an ethyl group from the α -carboxylic acid group of the glutamic acid moiety of glorin, producing an inactive metabolite M1 (see figure). We are currently engaged in purifying glorinase to identify the protein by proteomic approaches. In this process, we noticed a second enzymatic activity that further hydrolyses M1 to yield M2. Preliminary data suggest that this enzymatic activity can be separated from glorinase. The goal of the master project is to further characterize the M1-converting activity and to develop a protocol to purify the enzyme based on activity guided fractionation.



D. Heinrich, R. Barnett, L. Tweedy, R. Insall, P. Stallforth & T. Winckler (2018). The chemoattractant glorin is inactivated by ester cleavage during early multicellular development of *Polysphondylium pallidum*. ACS Chem. Biol. 13, 1506-1513