# “Chemicals in my food? Yes please!” Studying assimilation pathways in yeasts


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Yeasts are a polyphyletic group of fungi that predominantly adopts a unicellular lifestyle. Like other microorganisms, yeasts are adept at extracting macronutrients such as carbon, nitrogen and sulfur from a wide array of chemical compounds. My research focuses on (1) identifying and characterizing the metabolic pathways involved in the assimilation of specific classes of compounds and (2) exploring how the presence of these pathways in a particular taxonomic group of yeasts is influenced by their natural environment [1]. Comparative genomics is one of the primary tools in my research, which I use to look for genes whose presence in a particular genome correlates with the ability of the species to assimilate a specific substrate. In the past, I have used this approach to successfully identify a putative choline monooxygenase, which turned out to be essential for the assimilation of choline as a nitrogen source [2]. More recently I have identified two additional enzyme candidates responsible for the assimilation of sulfamates and cyclic imides as sources of sulfur and nitrogen, respectively (unpublished data). In addition to assigning functions to so-called “orphan genes”, I have also identified two new “orphan pathways” in yeast – that is to say, pathways that are only known from the substrates that they assimilate. The first such pathway involves the assimilation of the toxic compound cyanate ($OCN^-$) as a source of nitrogen by a number of yeast species [3] while the second pathway involves the assimilation of aromatic sulfonates as sulfur sources by the soil-living yeast *Lipomyces starkeyi* [4].

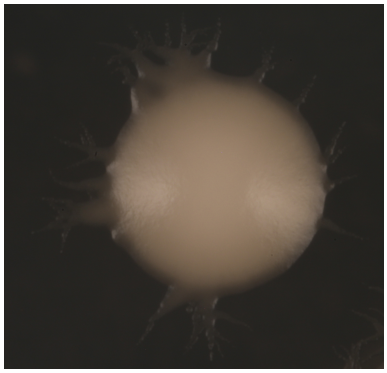

**Figure 1**. Close-up of a yeast colony growing on an agar surface. This colony measures roughly 2 mm across and consists of millions of individual yeast cells.


[1] T. Linder. *Yeast* **2019**, In press.

[2] T. Linder. *Microbiology* **2014**, *160*, 929-940.

[3] T. Linder. *World J Microbiol Biotechnol.* **2019**, *35*, 3.

[4] T. Linder. *Antonie Van Leeuwenhoek* **2016**, *109*, 1417-1422.