

SPECIAL BIOCHEMISTRY SEMINAR

**“The wine yeast *Hanseniaspora vineae*,
a new eukaryotic cell model for
understanding benzenoids and other
phenylpropanoids synthetic pathways”**



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Saccharomyces cerevisiae, the yeast used widely for beer, bread, cider, and wine production, is the most resourceful eukaryotic model used for cell and molecular biology studies. During the past 20 years we had developed a ‘Yeast Flavor Diversity Screening’ strategy which integrates knowledge from sensory analysis, winemaking and flavor metabolic footprinting methods to select new native strains. Many strains of the yeast *Hanseniaspora vineae* were selected by this process since 2002 due to their sensory fruity impact in experimental wine fermentations. The flavor phenotype was associated to its highly synthetic capacity to form benzenoids and other phenylpropanoids derived from the three aromatic amino acids, phenylalanine, tyrosine and tryptophane.

Genomic, transcriptomic and metabolomic studies of this species showed that it is part of the *Saccharomyces* complex and diverged before the whole genome duplication event. It is an ancestral apiculate yeast that has bipolar vegetative reproduction and although this species is part of the most abundant yeast genus of grapes, it is metabolically unique within *Hanseniaspora*. *H. vineae* produced phenolic flavor compounds during wine fermentation of about 1–2 orders of magnitude higher than that by *S. cerevisiae* and the other species of this genus. This characteristic allowed us to understand *de novo* synthesis of benzenoids in yeast, compounds usually associated with plant fruits. After exploring these pathways, we were able to show that the mandelate pathway is involved in synthesizing 4-hydroxybenzoate 4HB, the aromatic ring precursor of coenzyme Q6 in yeast. Our results might offer an answer to the long-standing question of the origin of the benzoquinone ring for the synthesis of Q10 in humans. Preliminary results about the fast cell lysis characteristics of this species showed their impact in the increase palate flavor phenotype compared to conventional wine yeasts, but this crazy behavior might also help to use this cell model for studying apoptosis mechanisms and life span regulation in eucaryotes.

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Or via Zoom Meeting ID: 968 3651 8237

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