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Production of membrane proteins in yeast

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Background

Yeast is an important and versatile organism for studying membrane proteins. It is easy to cultivate and can perform higher eukaryote-like post-translational modifications.

S. cerevisiae has a fully-sequenced genome and there are several collections of deletion strains available, whilst *P. pastoris* can produce very high cell densities (230 g/l).

Results

We have used both *S. cerevisiae* and *P. pastoris* to over-produce the following His_6 and His_{10} carboxyl terminal fused membrane proteins. CD81 – 26 kDa tetraspanin protein (TAPA-1) that may play an important role in the regulation of lymphoma cell growth and may also act as the viral receptor for Hepatitis C-Virus. CD82 – 30 kDa tetraspanin protein that associates with CD4 or CD8 cells and delivers co-stimulatory signals for the TCR/CD3 pathway. MC4R – 37 kDa seven transmembrane G-protein coupled receptor, present on neurons in the hypothalamus region of the brain and predicted to have a role in the feast or fast signalling pathway. Adt2p – 34 kDa six transmembrane protein that catalyses the exchange of ADP and ATP across the yeast mitochondrial inner membrane.

Conclusion

We show that yeasts are flexible production organisms for a range of different membrane proteins. The yields are such that future structure-activity relationship studies can be initiated *via* reconstitution, crystallization for X-ray diffraction or NMR experiments.

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