We implemented **constitutive** and **inducible promoters** of varying strength for the production of **biomolecules** in *S. cerevisiae*.

Synthetic promoters for the production of biomolecules in yeast

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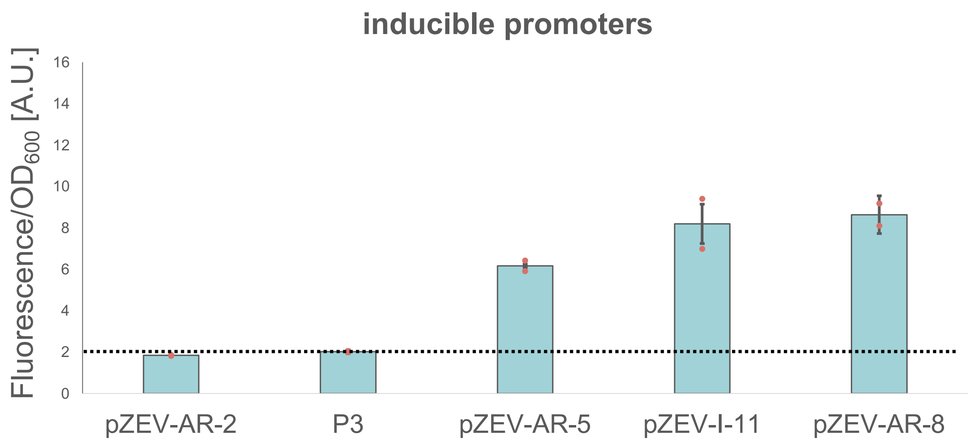
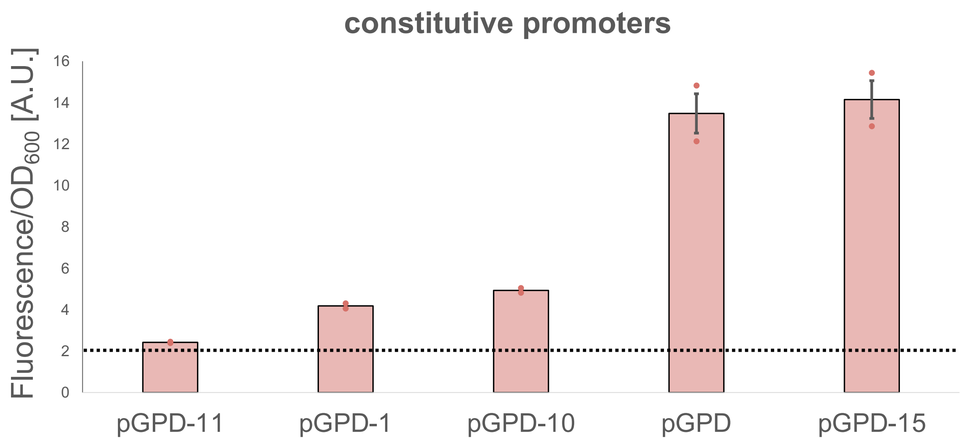
Background

- Promoters are essential for the controlled expression of proteins.
- Here we tested the strength of **model-based (synthetic)**[1] inducible and constitutive promoters in the CEN.PK 113-5D strain by controlling the expression of an sGFP reporter protein.





Results

- Five inducible promoters were tested, of which three are similar in strength (moderate) and two show no activity compared to the empty vector control (dashed line).
- Of the five constitutive promoters, two show strong activity, two show weak activity, and one shows no activity.

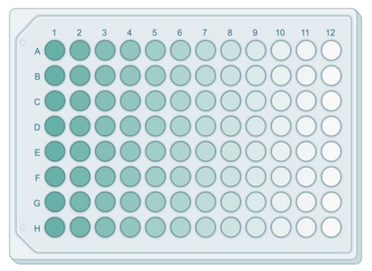
Discussion

- The sets of promoters (weak, moderate, and strong) allow for a finetuning in the production of biomolecules.
- This broadens the possible applications in the regulation of whole (synthetic) pathways[1].
- The modeled sequences minimize the chance of homologous recombination events commonly occurring in *S. cerevisiae*[1].

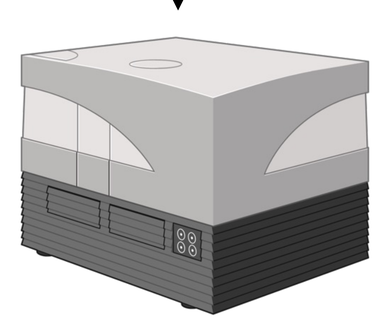
Procedure

a) Cultivation at 30 °C, induction (1 µM **β**-Estradiol) and expression at 30 °C for 20 h

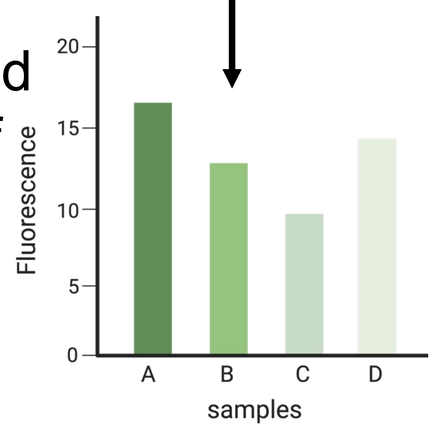
b) Transfer and dilution into a 96-well plate



c) Fluorescence measurement via plate reader



d) Analysis and comparison of fluorescence intensities



References

[1] B.J. Kotopka and C.D. Smolke; Model-driven generation of artificial yeast promoters; Nature Communications 2020

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