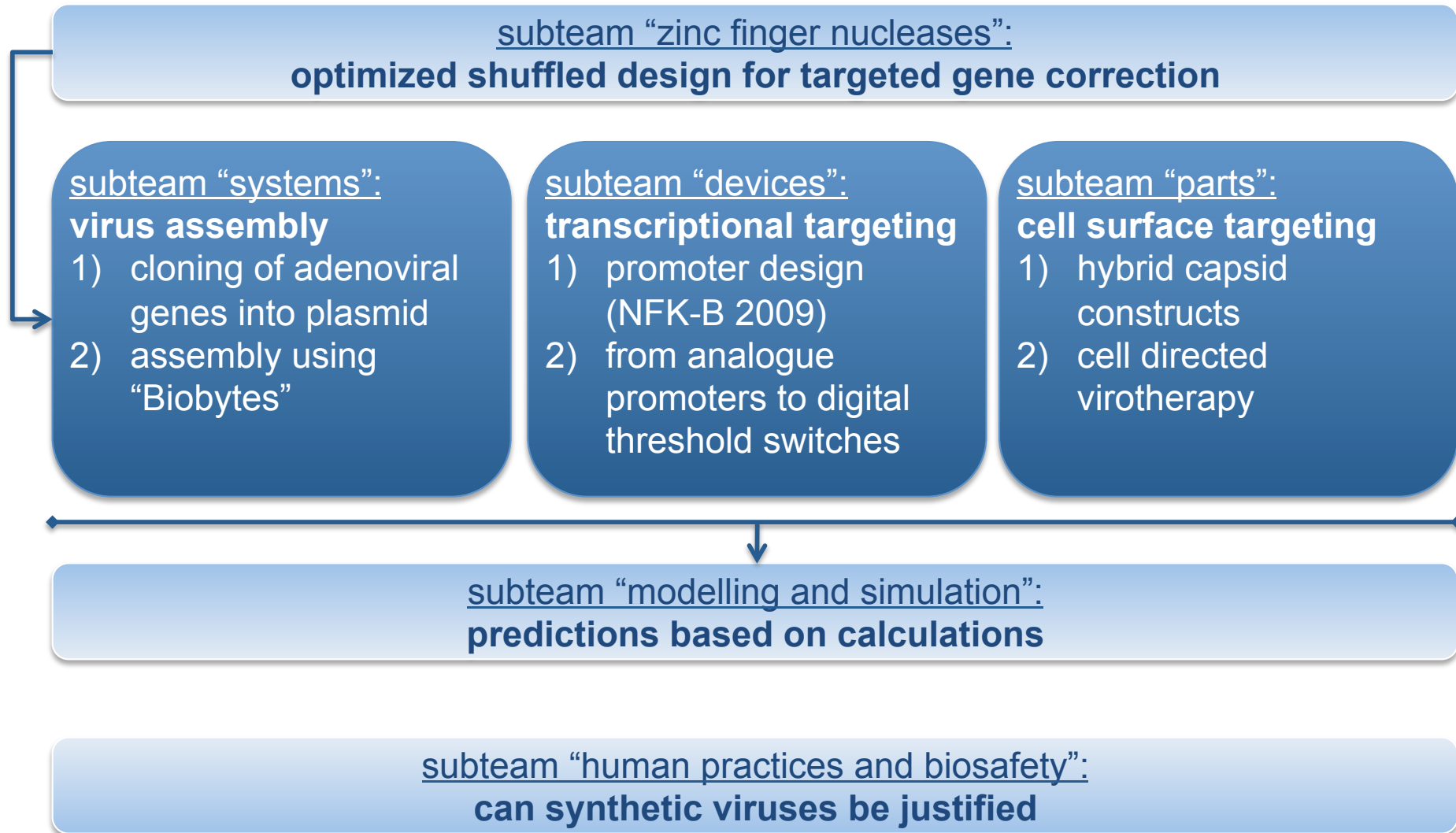


written concept

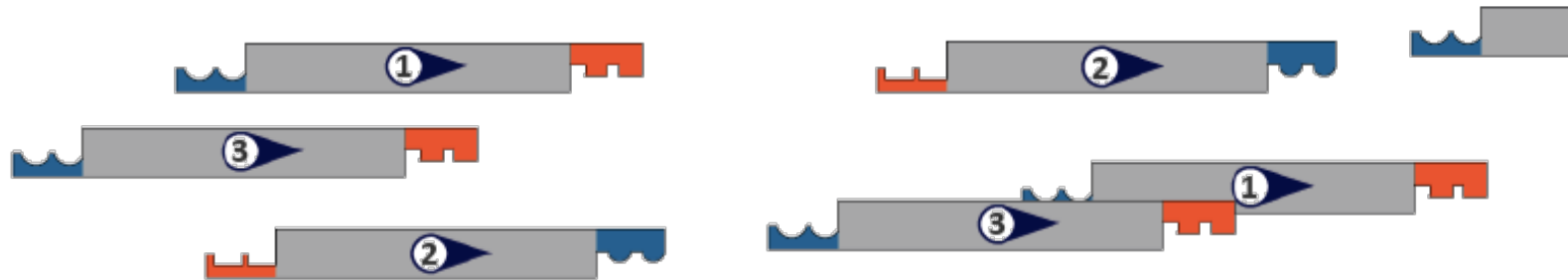
- We aim to develop a standard protocol for **design of synthetic viruses**.
- Those viruses should be tissue-specific due to **recognition of cell surface markers**.
- Moreover a threshold device as a sensitive **promotor system** enables defined viral replication and host cell lysis depending on intracellular signals.
- The synthetic viruses can be applied to transfect ensemble **zinc finger nucleases** for targeted gene correction.

project overview

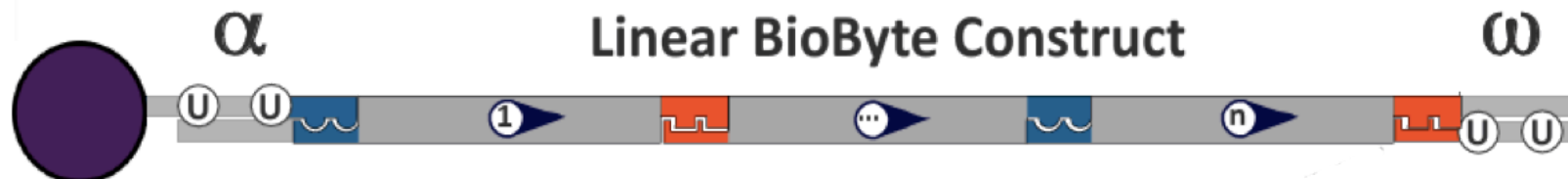
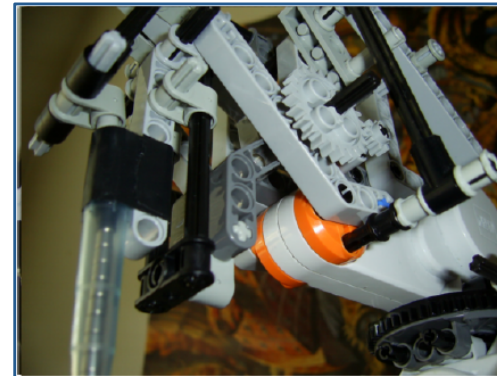


design of vector plasmid

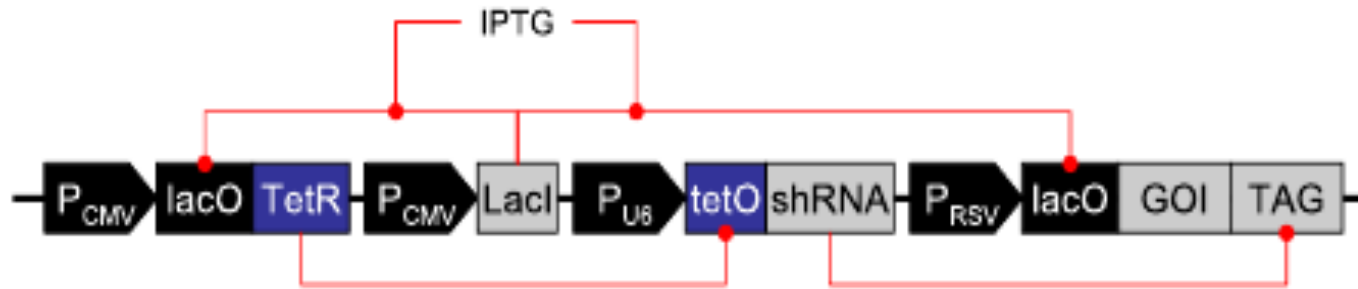
- usage of “BioBytes” (iGEM Team Alberta 2009)
 - allows rapid **assembly of synthetic viral genomes**



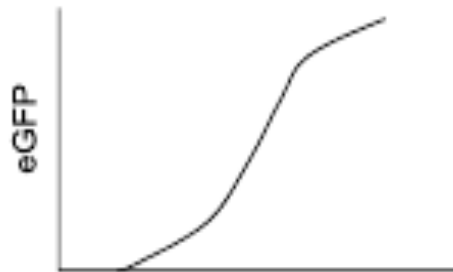
automatization:
LEGO mindstorms
pipetting system
(250€)



threshold devices



GOI = eGFP



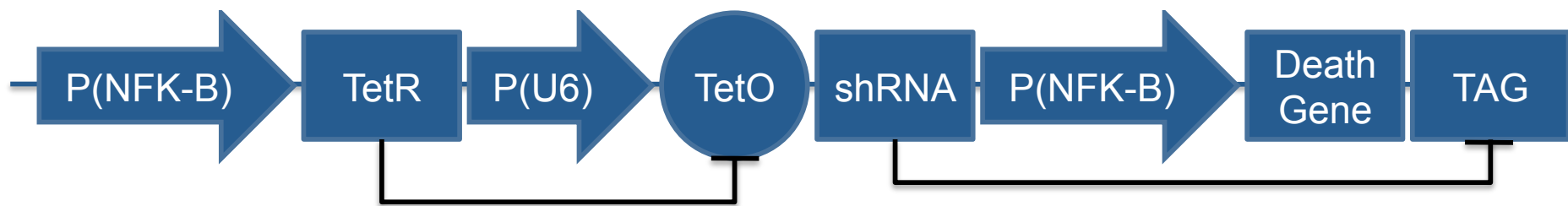
IPTG

GOI = Bax



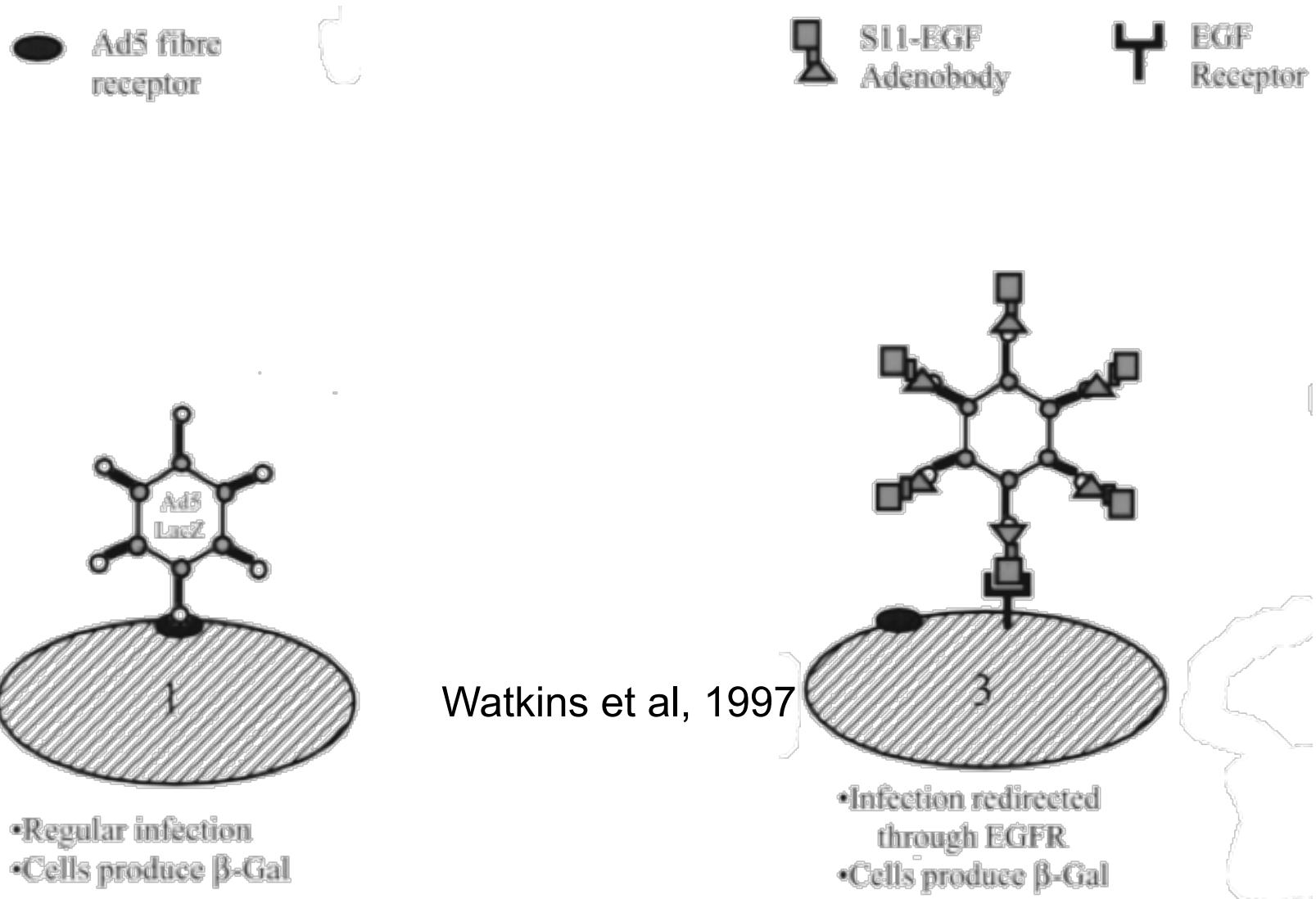
IPTG

Fussenegger
& Weber, 2009



- e. g. based on NFK-B specific promoter
- strategy: high-throughput screening of TetO/TAG repressors

cell surface targeting



different calculations

coupled but independent approaches: wet lab + dry lab

- certain attempts to predict immune response after viral infection²
 - simple mathematical models can ease understanding of drug therapy
- evaluation of virus assembly and zinc finger efficiency
 - intertwined theory and practice
- simulations for gene cluster interactions required³
 - target determination due to putative perturbation results
- engineering of genetic circuits for input-output regulation⁴
 - characterization of synthetic promoters

[2] Wang, Z. & Liu, X., A chronic viral infection model with immune impairment. *J Theor Biol* 249 (3), 532-542 (2007).

[3] Feng, X.J. *et al.*, *Optimizing genetic circuits by global sensitivity analysis. Biophys J* 87 (4), 2195-2202 (2004).

[4] Voigt, C.A., Genetic parts to program bacteria. *Curr Opin Biotechnol* 17 (5), 548-557 (2006).

cooperation

virotherapy:

- PD Dr. Dirk Nettelbeck (DKFZ)
- PD Dr. Manfred Schmidt (DKFZ)

genetherapy:

- PD Dr. Dirk Grimm (BioQuant)

zinc finger nucleases:

- D. Phil. Sehyo „Charley“ Choe (DKFZ)
- PhD Joel Beaudouin (EMBL)

+ „the other project“



... fulfilled.