



Vaccine Development in the Context of Synthetic Biology Principles



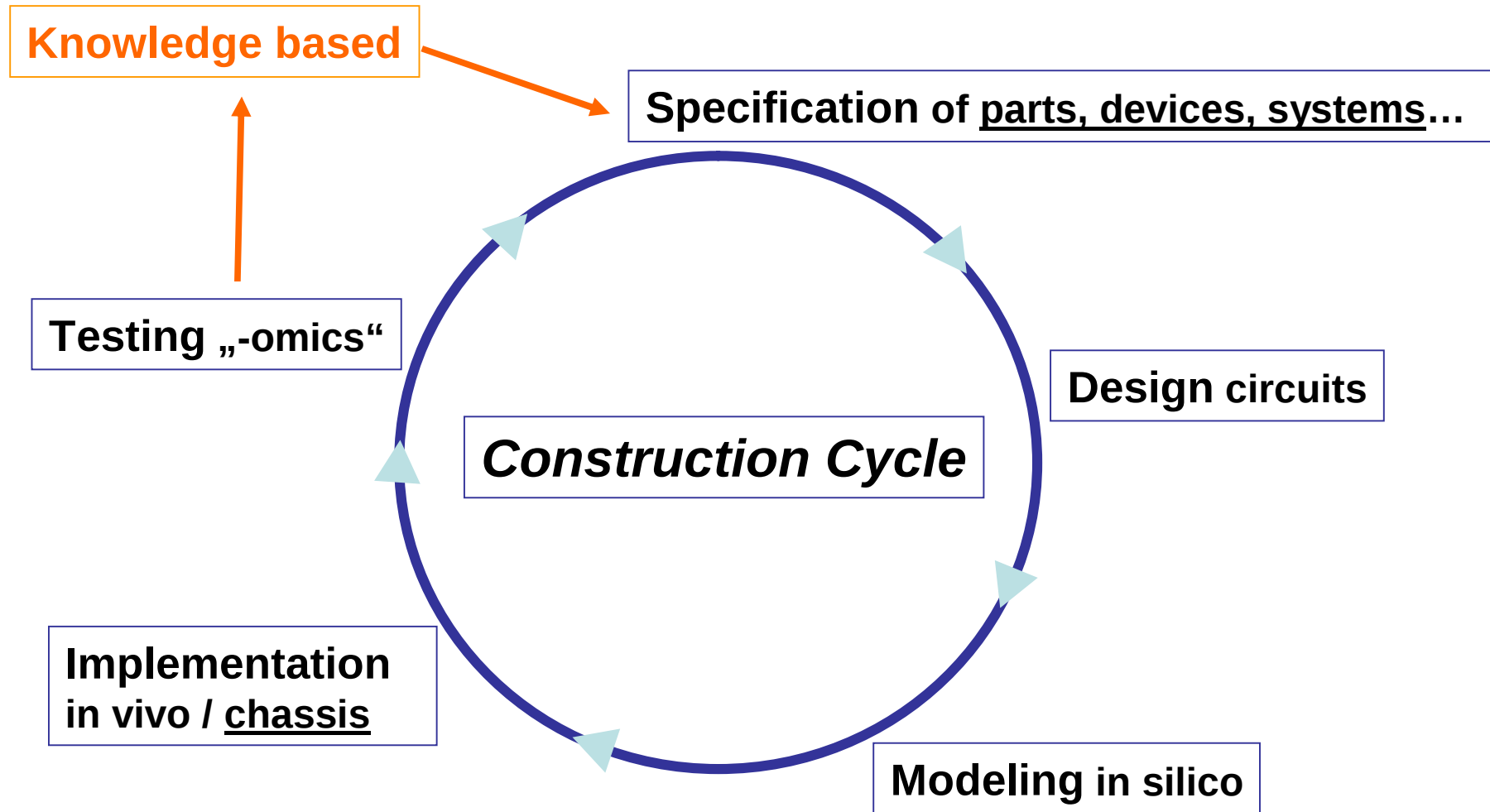
Opportunities and Challenges in the Emerging Field of Synthetic Biology

Washington, DC July 9th 2009

Frank Notka, GENEART

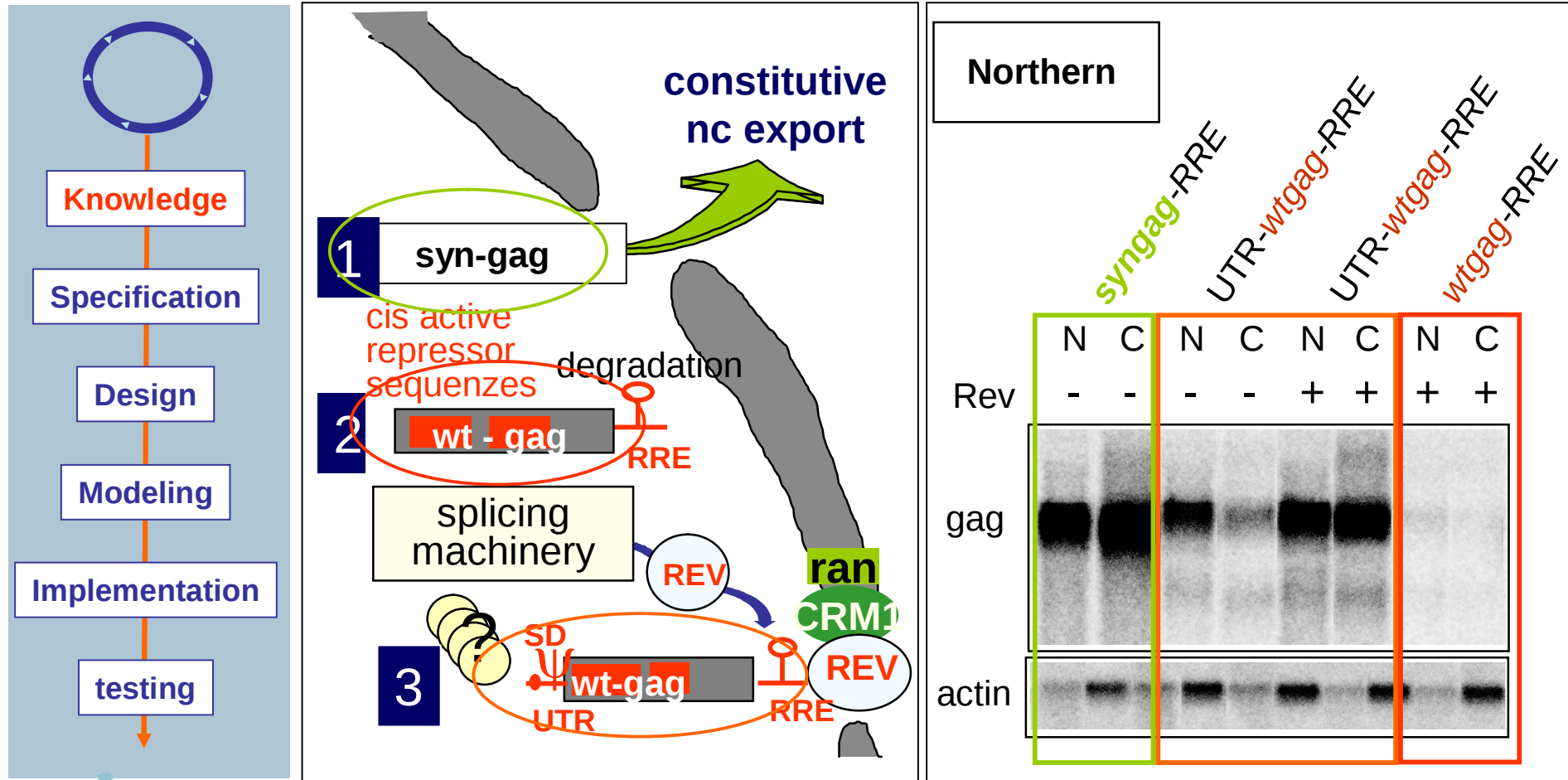
Ralf Wagner, GENEART, University of Regensburg

How to build a novel system?

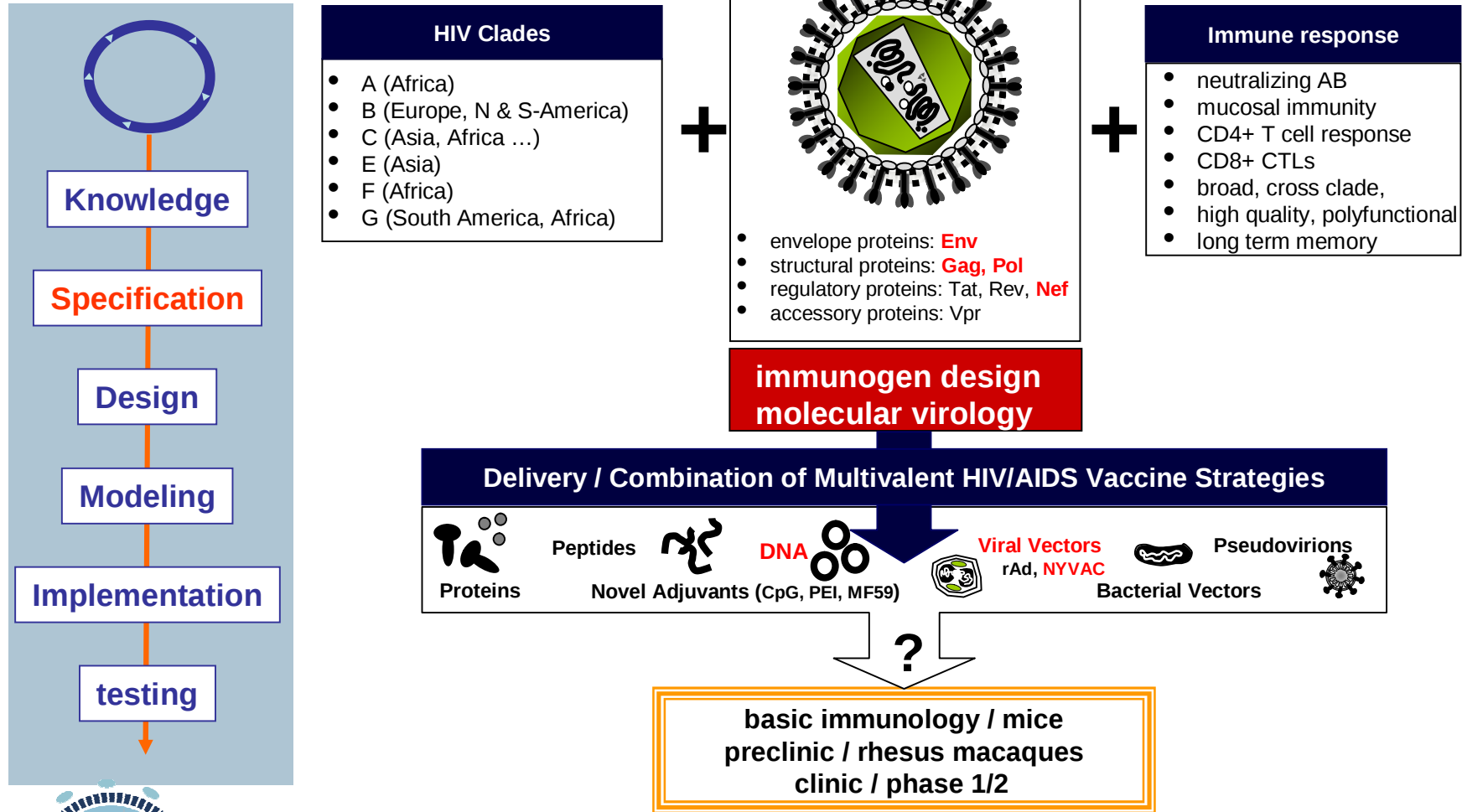


Knowledge: Understanding Regulation of Expression

Lentiviral Gene Expression: HIV-GAG

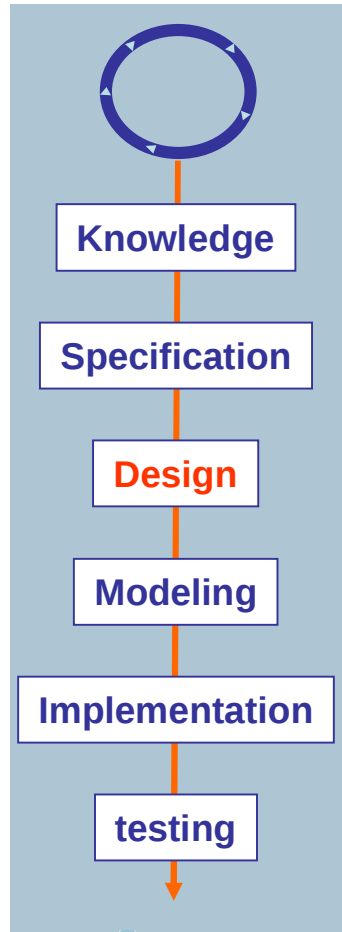


Specification: Integrated Vaccine Strategies

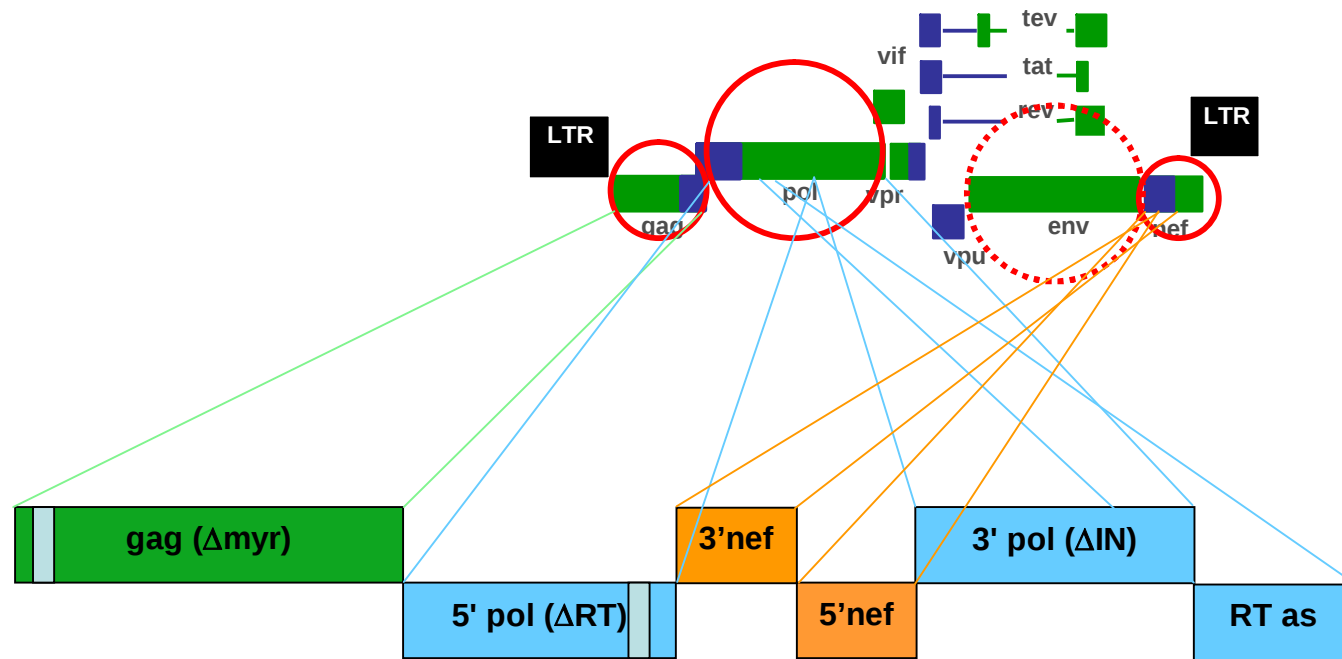


Design: Function – Safety - Efficacy

Rational Antigen Design

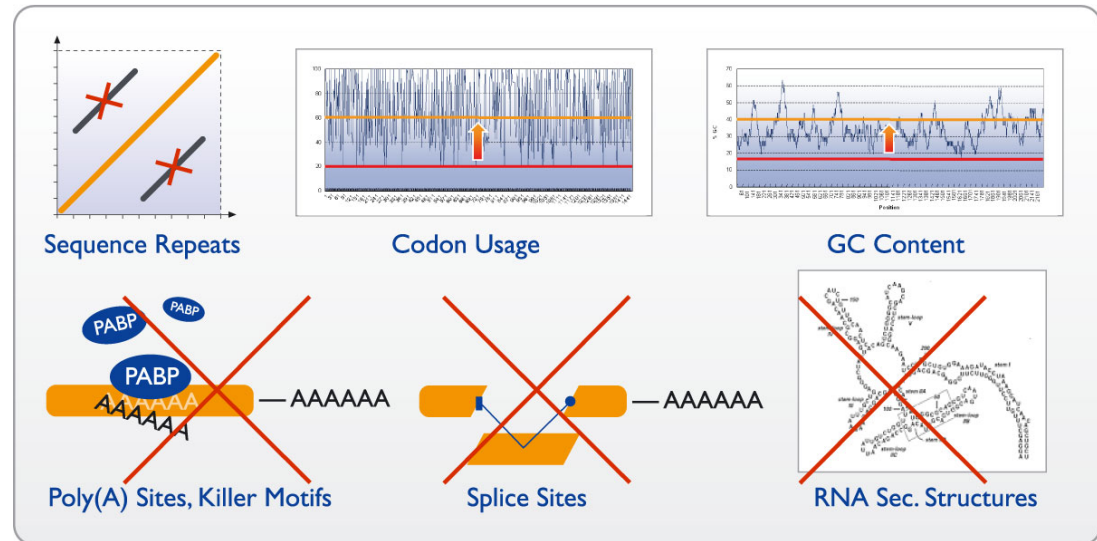
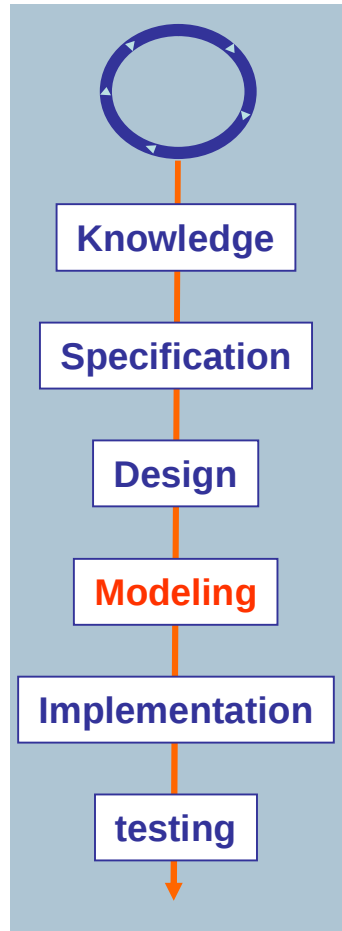


Sequence analysis of C (CN54)

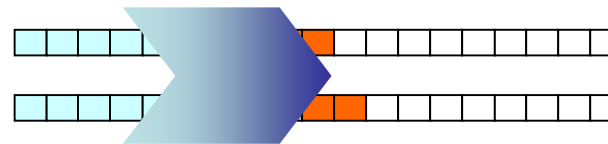


Modeling: Gene Analysis & Optimization

In silico multi-parameter sequence analysis and optimization

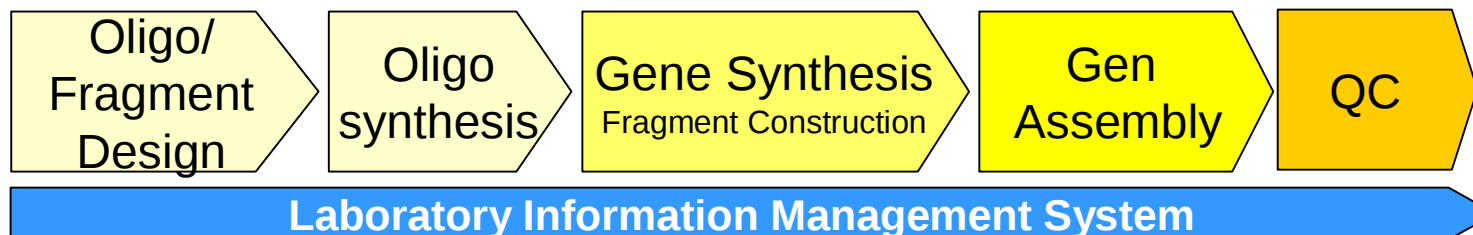
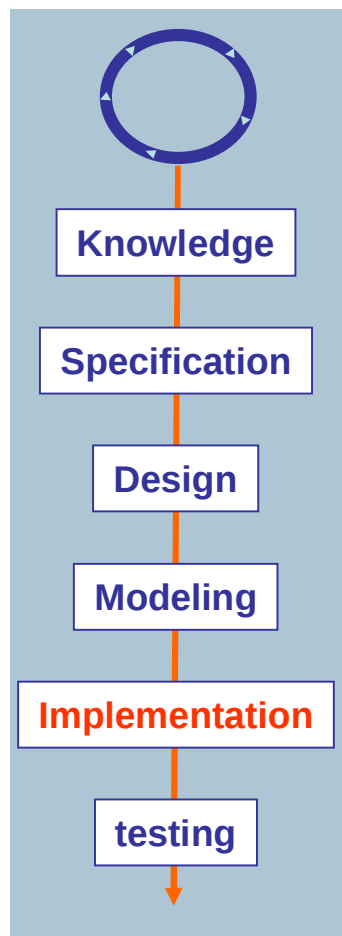


Sliding window approach (Gene Optimizer™)



Implementation: Gene Synthesis & Vector Production

Gene synthesis process



“Chassis” Production



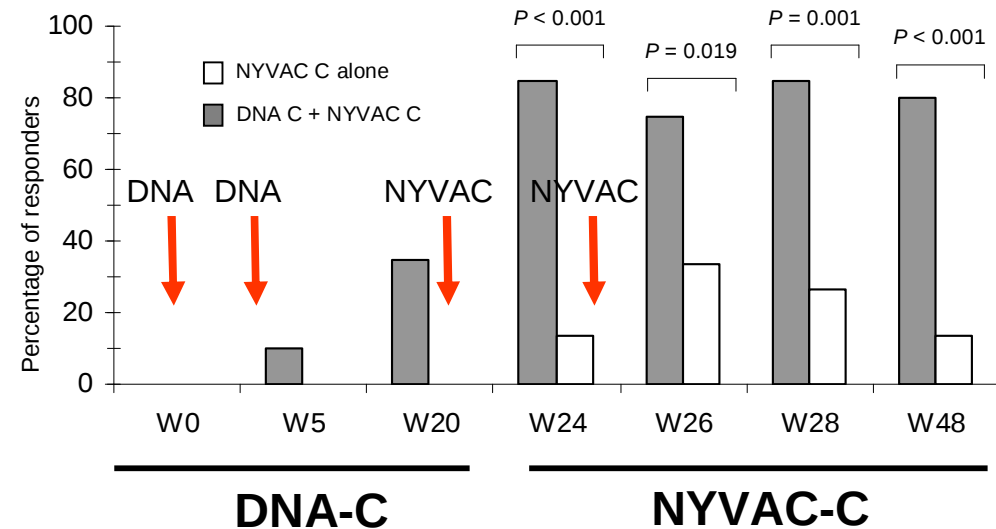
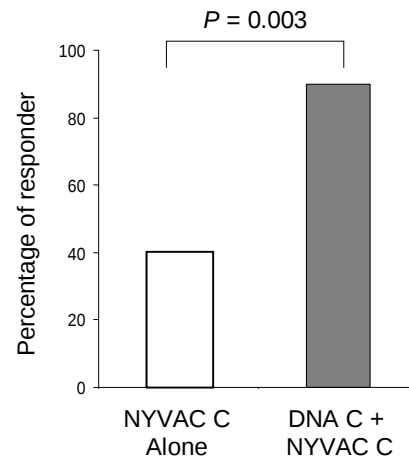
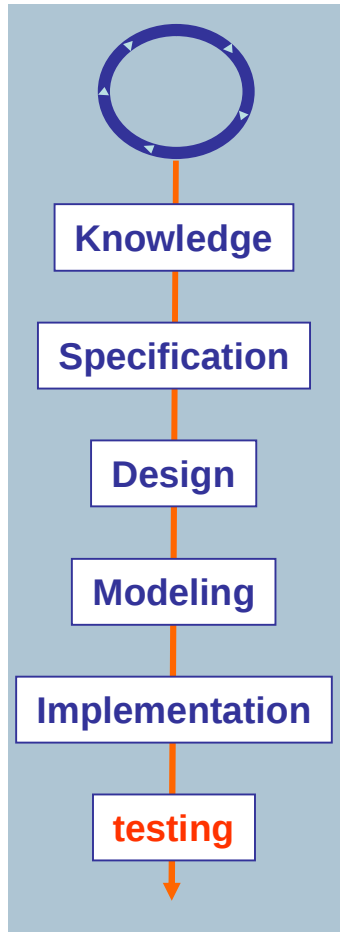
	Clade	Delivery	Developer / Manufacturer
GagPolNef	C (CN54)	DNA-C	UREG / Cobra
Env	C (CN54)	DNA-C	UREG Cobra
GagPolNef / Env	C (CN54)	NYVAC-C	Sanofi Pasteur
GagPolNef / Env	C (CN54)	MVA-C	Esteban
GagPolNef / Env	C (CN54)	vTT-C	Y. Shao / S-CDC
GagPolNef / Env	B	NYVAC-B	Sanofi Pasteur
GagPolNef / Env	B	MVA-B	Esteban



Testing: Clinical trial *EV02*

Percentage of Responders (gIFN+ T cells)

Study design: 2 x 20 HIV negative volunteers
London and Lausanne

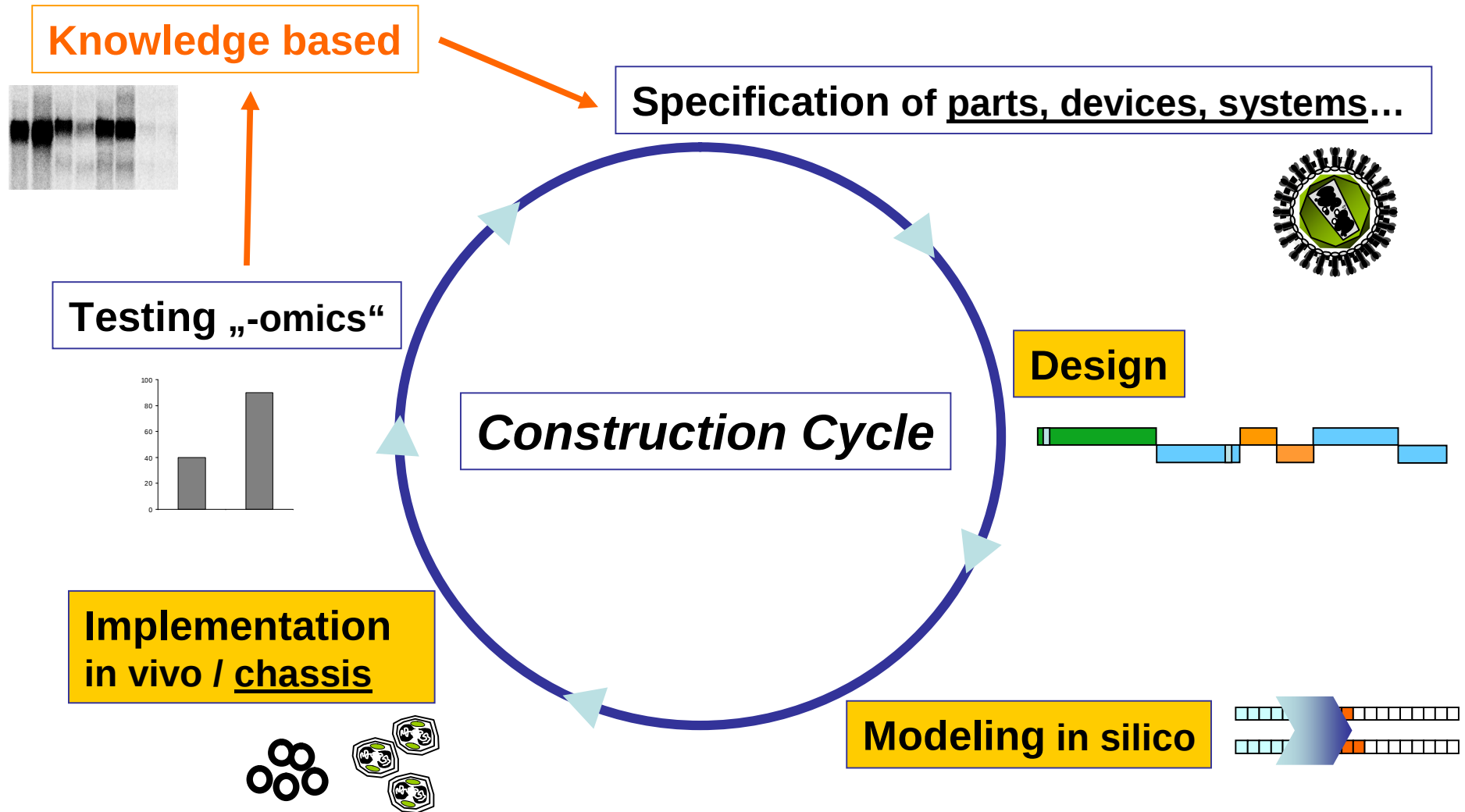


Higher percentage of responders in DNA-C prime / NYVAC-C boost group (>90%) compared to NYVAC-C group (<40%)

Durability DNA-C / NYVAC-C >> NYVAC-C



What is new?



Implications