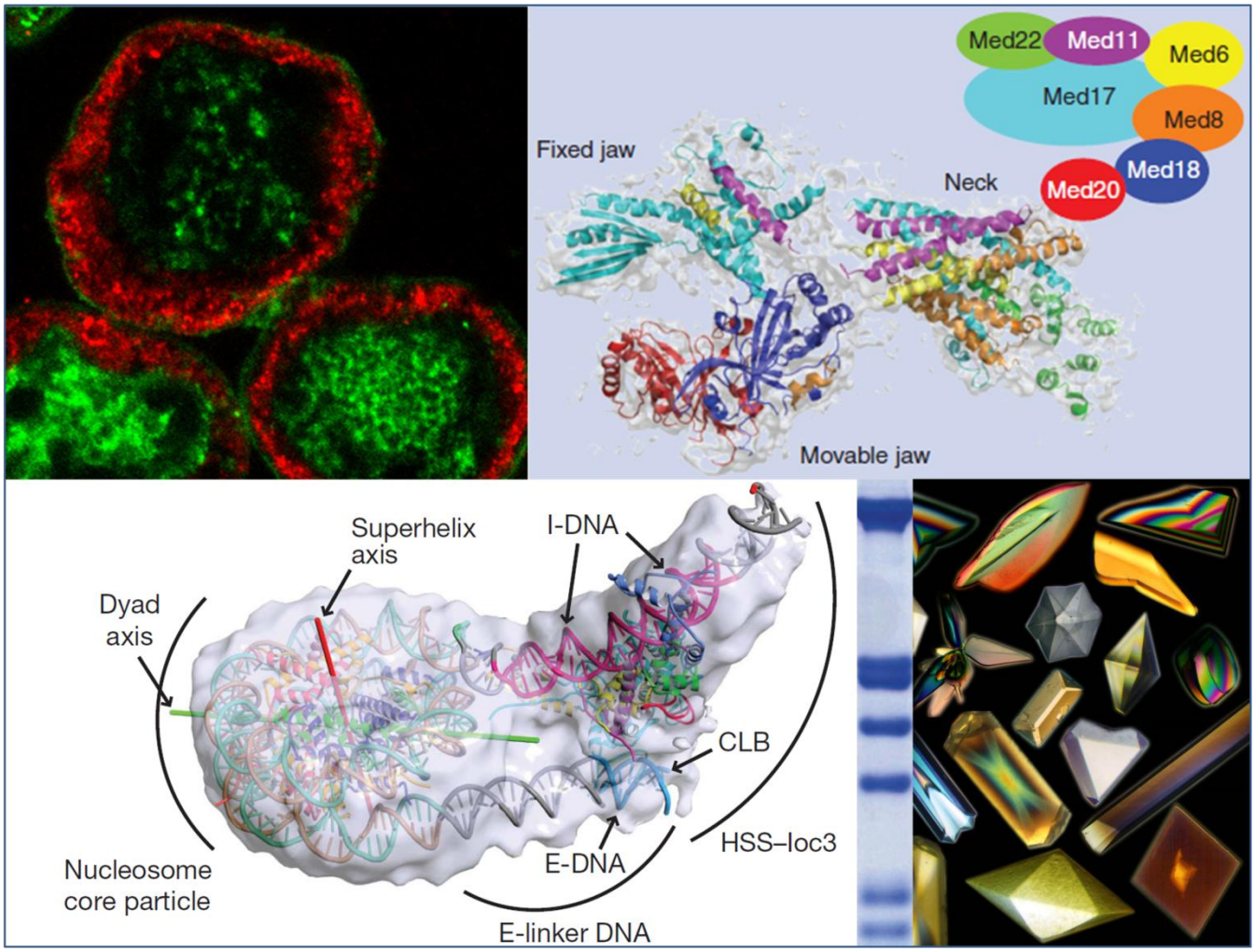
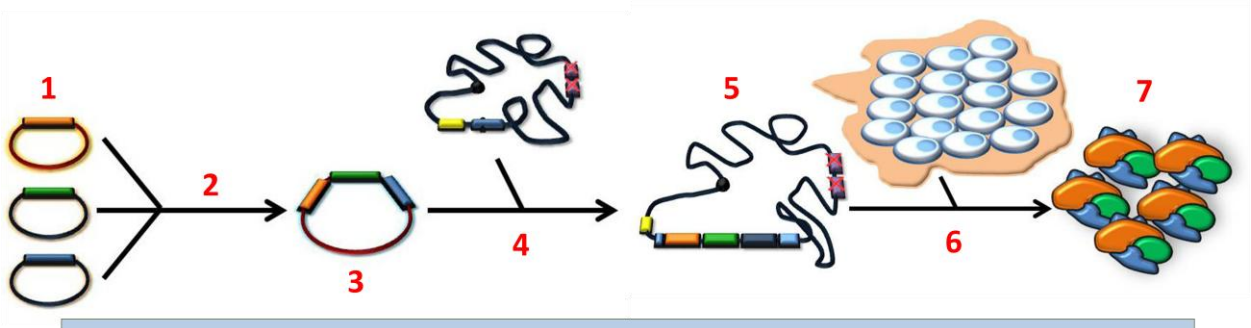
MultiBac™

Baculovirus Expression in Insect Cells

GENEVA BIOTECH

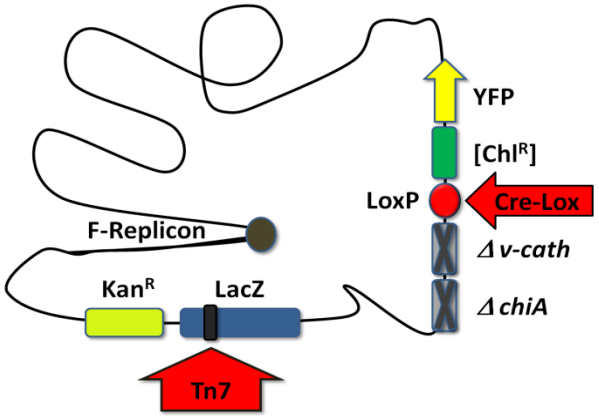




How MultiBac™ Works:

1. Design and clone your gene(s) of interest (GOIs) into MultiBac™ acceptor and donor vectors
2. Match and mix your GOIs and then (re)combine them into one construct
3. Select your construct using unique combination of antibiotic resistance markers
4. Transfer the entire GOIs-assembly into the MultiBac™ bacmid
5. Select and amplify your gene-containing MultiBac™ bacmid
6. Transfect insect cells with purified MultiBac™ bacmid
7. Expression of protein in insect cells

MultiBac™ Baculoviral DNA



Specific Viral Gene Deletions to Improve Expression Characteristics

- Elimination of viral protease activity
- Engineered to boost production of membrane proteins and secreted proteins

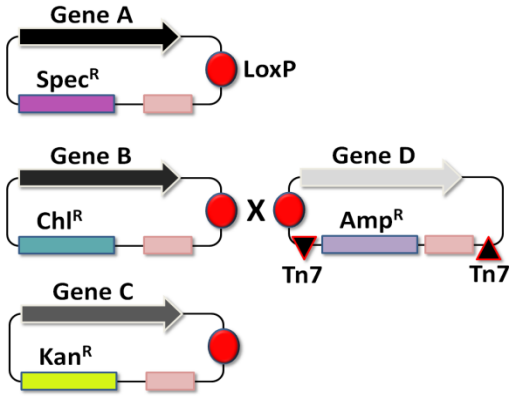
Two Separate Entry Sites for Heterologous Gene-Containing Plasmids

- Tn7 and LoxP entry sites
- Easy expression of multiple proteins
- Co-expression of folding enzymes for low yield proteins, or post-translational modification enzymes such as glycosylation enzymes

Ease of Monitoring Virus Production

- Virally encoded fluorescent protein
- No need for time consuming viral titer estimations

MultiBac™ Transfer Vectors



Suite of Transfer Vectors

- 5 transfer vectors
- All contain DNA recombination elements and a separate antibiotic markers

Easy Fusion of Transfer Vectors Using DNA Recombination

- LoxP sequence allow fusion of multiple transfer vectors
- Compatible with high throughput setups

Vectors Enter the MultiBac™ Baculovirus DNA at Two Separate Sites

- *In vivo* DNA recombination using Tn7 transposition or Cre-Lox recombination

Small Size

- Fully synthetic plasmids: only required DNA elements
- Maximal convenience for large genes or multiple genes

MultiBac™ Scientific Publications

1) **The architecture of human general transcription factor TFIID core complex.** 2013. Bieniossek C, Papai G, Schaffitzel C, Garzoni F, Chaillet M, Scheer E, Papadopoulos P, Tora L, Schultz P, Berger I. ***Nature*** 493, 699-702.

2) **MultiBac Complexomics.** 2012. Trowitzsch, S., Palmberger, D., Fitzgerald, D., Takagi, Y. & Berger, I. ***Expert Rev. Proteomics*** 9, 363-73.

3) **MultiBac: expanding the research toolbox for multiprotein complexes.** 2011. Bieniossek, C., Imasaki, T., Takagi, Y. & Berger, I. ***Trends Biochem. Sci.*** 37, 49-57.

4) **Structure and mechanism of the chromatin remodelling factor ISW1a.** 2011. Yamada K, Frouws TD, Angst B, Fitzgerald DJ, DeLuca C, Schimmele K, Sargent DF, Richmond TJ. ***Nature*** 472, 448-53.

5) **New baculovirus expression tools for recombinant protein complex production.** 2010. Trowitzsch, S., Bieniossek, C., Nie, Y., Garzoni, F. & Berger, I. ***J Struct Biol.*** 172, 45-54.

6) **Getting a grip on complexes.** 2009. Nie, Y., Viola, C., Bieniossek, C., Trowitzsch, S., Vijay-Achandran, L.S., Chaillet, M., Garzoni, F. & Berger, I. ***Curr Genomics*** 10, 558-72.

7) **Towards eukaryotic structural complexomics.** 2009. Bieniossek, C. & Berger, I. ***J Struct Funct Genomics*** 10, 37-46.

8) **MultiBac: multigene baculovirus-based eukaryotic protein complex production.** 2008. Bieniossek, C., Richmond, T.J. & Berger, I. ***Curr Protoc Protein Sci.*** Chapter 5:Unit 5.20.

9) **Multiprotein expression strategy for structural biology of eukaryotic complexes.** 2007. Fitzgerald, D.J., Schaffitzel, C., Berger, P., Wellinger, R., Bieniossek, C., Richmond, T.J. & Berger, I. ***Structure*** 15, 275-9.

10) **Protein complex expression by using multigene baculoviral vectors.** 2006. Fitzgerald, D.J., Berger, P., Schaffitzel, C., Yamada, K., & Berger, I. ***Nat Methods*** 3, 1021-32.

11) **Baculovirus expression system for heterologous multiprotein complexes.** 2004. Berger, I., Fitzgerald, D.J. & Richmond, T.J. ***Nat Biotechnol.*** 22, 1583-7.