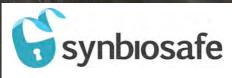


Biosafety and Public Outreach in Synthetic Biology

















Markus Schmidt, IDC, **Biosafety Working Group DG Sanco, Brussels** 18-19th March, 2010



"What I cannot create, I do not understand"

Richard Feynman

but...

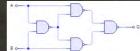
Do I understand what I can create?



Subfields of contemporary SB

- 1. DNA Synthesis
- 2. DNA based bio-circuits
- 3. Minimal genome
- 4. Protocells
- 5. Chemical SB











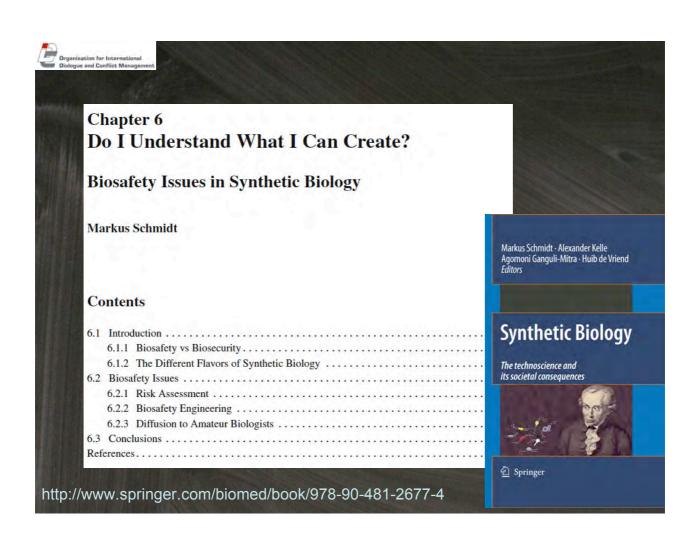
http://www.synbiosafe.eu/uploads/pdf/Schmidt_etal-2009-SSBJ.pdf

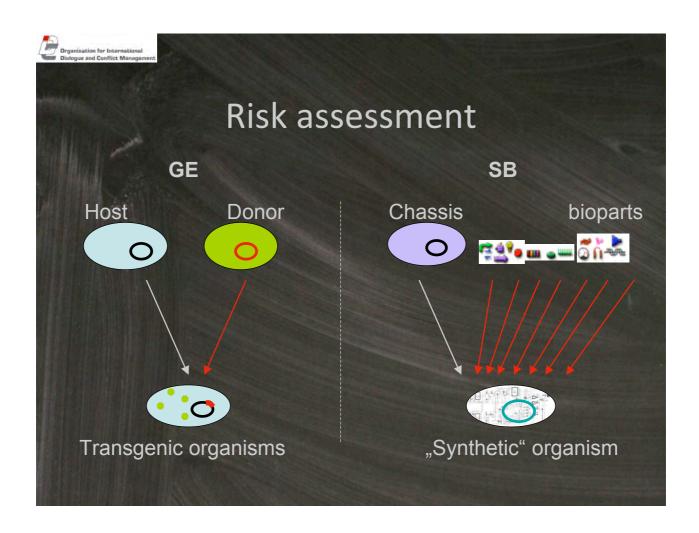


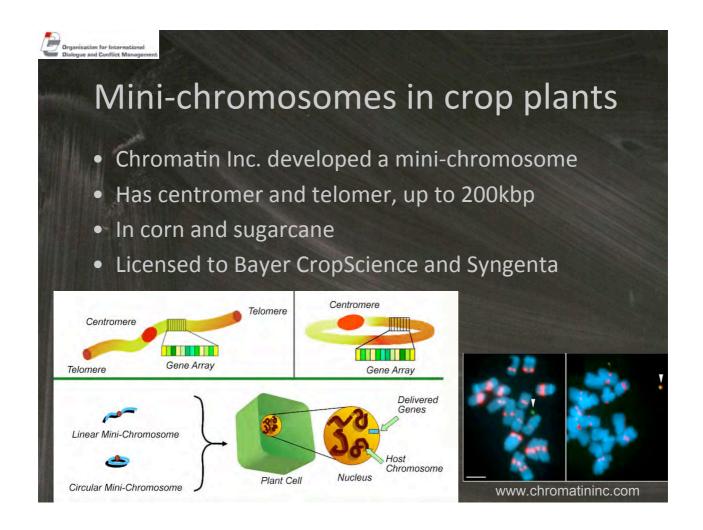
3 main biosafety challenges

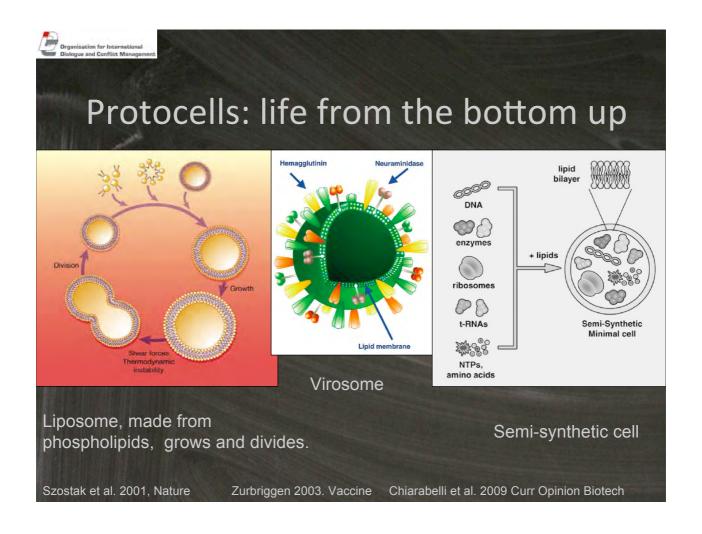
- Can we (still) assess the risks from new SB products, functions and systems?
- How can we improve safety through SB biosafety engineering?
- What happens if non-professionals start using SB?

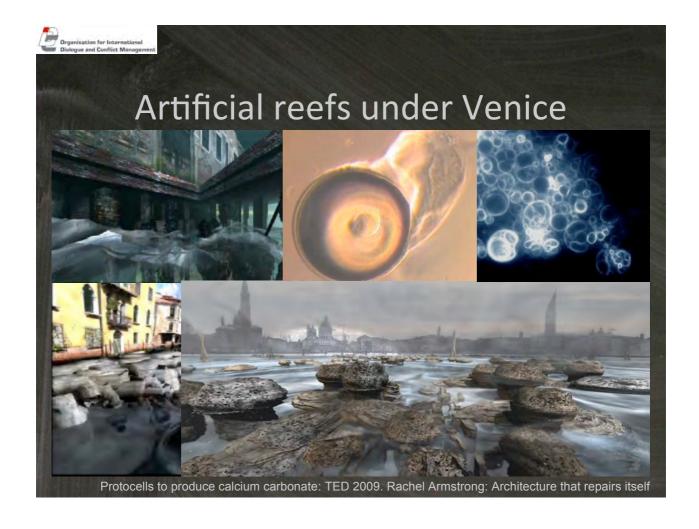
Organisation for International Dialogue and Conflict Management		Case-by-case				
		DNA synthesis	DNA-based biocircuits	Minimal genome	Proto-cells	Chemical SB
	Risk assessment					
	Biosafety engineering					
	DIYBio - diffusion					













Syst Synth Biol (2009) 3:65-75 DOI 10.1007/s11693-009-9039-2

RESEARCH ARTICLE

Social and ethical checkpoints for bottom-up synthetic biology, or protocells

Mark A. Bedau · Emily C. Parke · Uwe Tangen · Brigitte Hantsche-Tangen

Critical Reviews in Toxicology, 38:1-11, 2008 Copyright © 2008 Informa Healthcare USA, Inc. ISSN: 1040-8444 print / 1547-6898 online DOI: 10.1080/10408440701524519

informa

Lipid Vesicles as Membrane Models for Toxicological Assessment of Xenobiotics

Helmut H. Zepik and Peter Walde

Department of Materials, ETH Zürich, Zürich, Switzerland

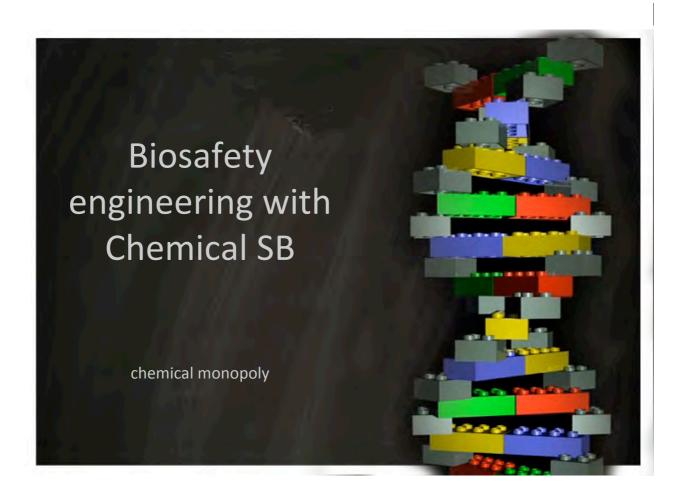
Elisabet L. Kostoryz, Jim Code, and David M. You

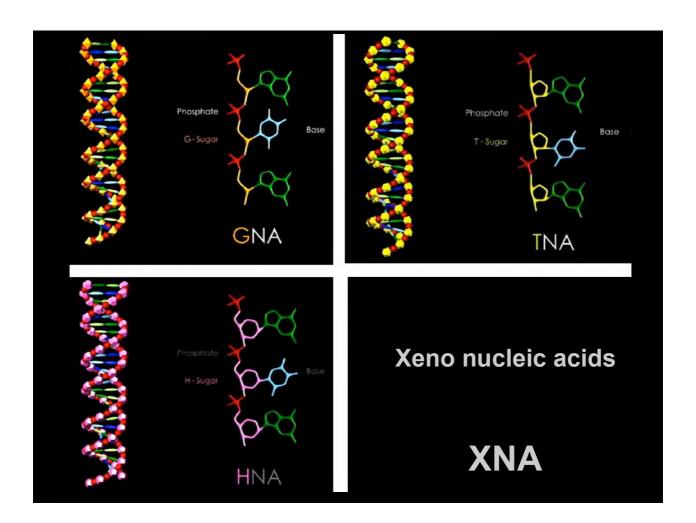
University of Missouri, Kansas City, Missouri, USA

RECENT ADVANCES WITH LIPOSOMES AS PHARMACEUTICAL **CARRIERS**

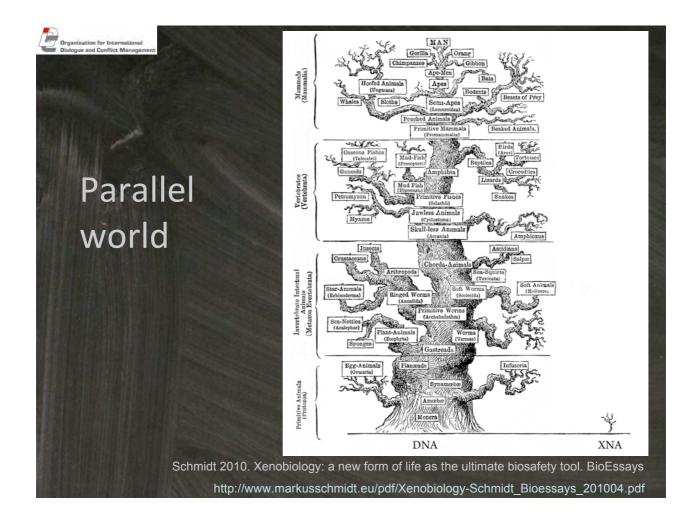
Vladimir P. Torchilin

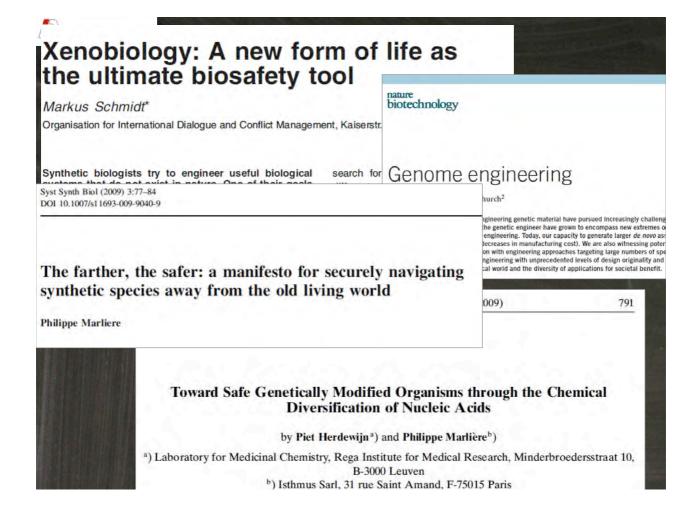
Abstract | Liposomes - microscopic phospholipid bubbles with a bilayered membrane structure - have received a lot of attention during the past 30 years as pharmaceutical carriers of great potential. More recently, many new developments have been seen in the area of liposomal drugs - from clinically approved products to new experimental applications, with gene delivery and cancer therapy still being the principal areas of interest. For further successful development of this field, promising trends must be identified and exploited, albeit with a clear understanding of the limitations of these approaches.

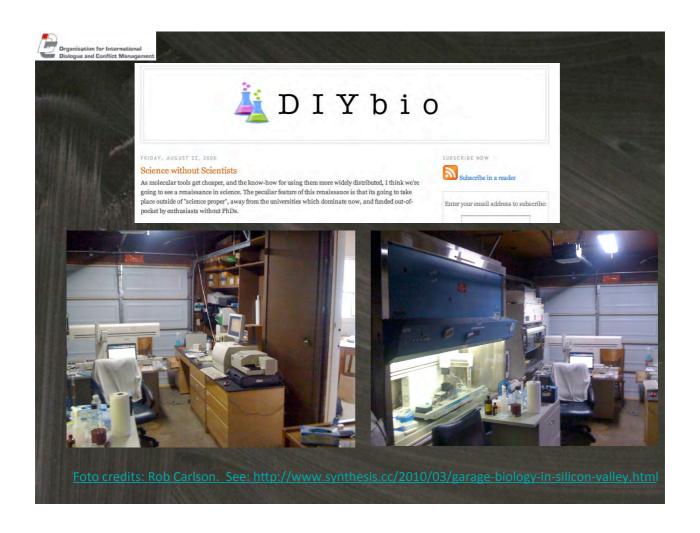




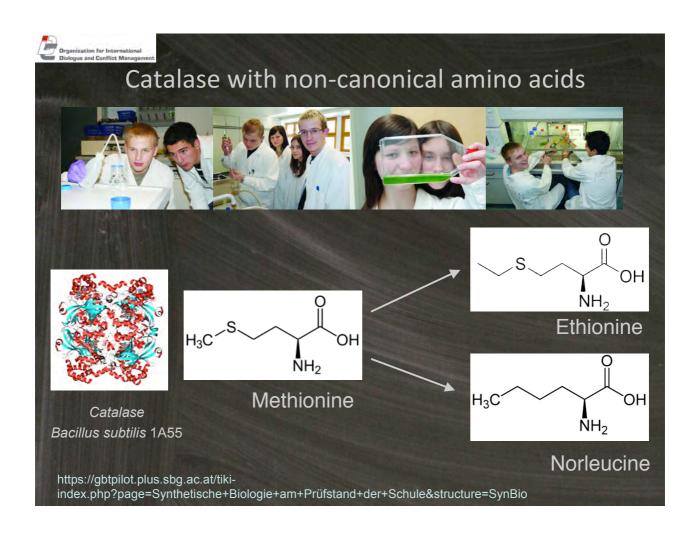




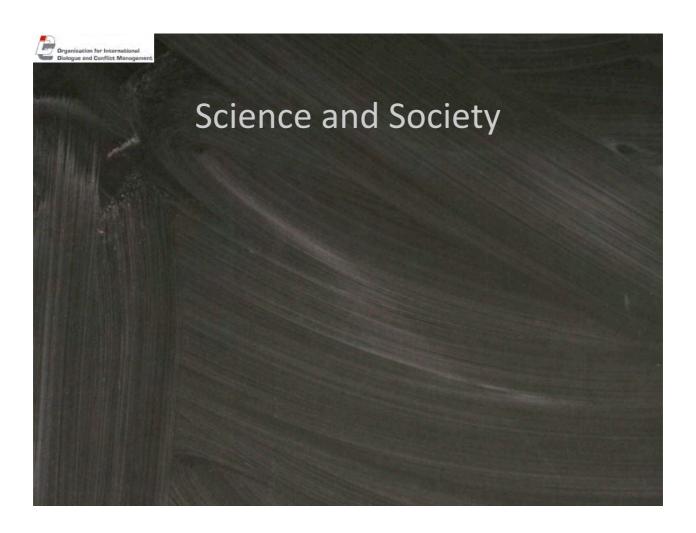


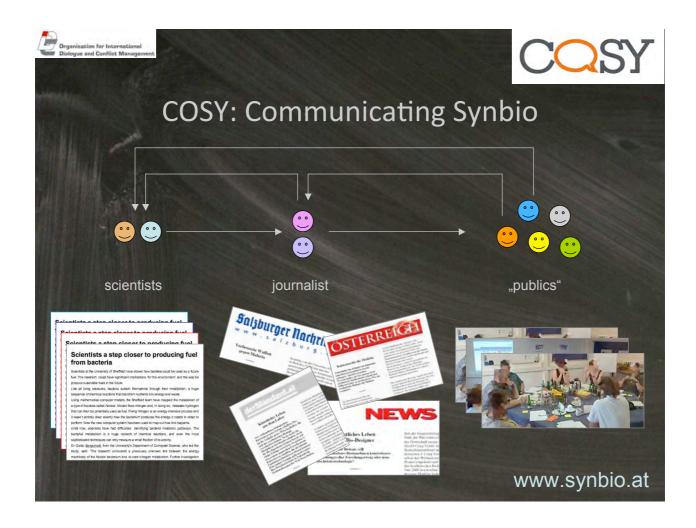


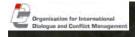












Results COSY

- Synbio specifics get lost in communication process: "old wine in new bottles"
- First neutral, then polarized opinions
- Risk the same for everybody
- Sceptics don't "buy" promised benefits



Syst Synth Biol (2009) 3:19-26 DOI 10.1007/s11693-009-9031-x

ORIGINAL RESEARCH ARTICLE

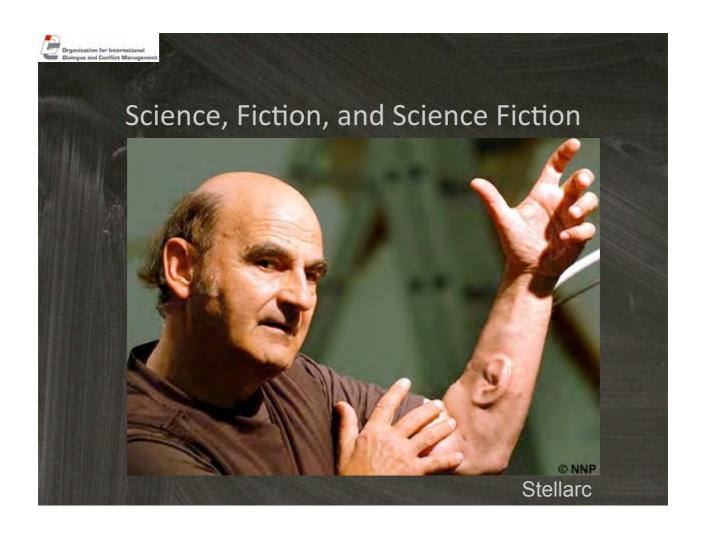
Communicating Synthetic Biology: from the lab via the media to the broader public

Nicole Kronberger · Peter Holtz · Wolfgang Kerbe · Ewald Strasser · Wolfgang Wagner

Received: 30 April 2009/Revised: 18 June 2009/Accepted: 29 June 2009 © The Author(s) 2009. This article is published with open access at Springerlink.com

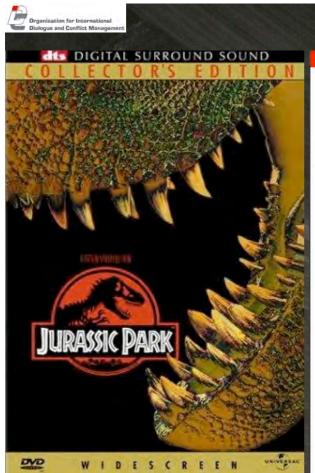
Abstract We present insights from a study on communew technology will be met with similar pu











IEWS FEATURE DARWIN 200

The order of the reference list and citations have been corrected in this PDF.



LET'S MAKE A MAMMOTH

Evolution assumes that extinction is forever. Maybe not. **Henry Nicholls** asks what it would take to bring the woolly mammoth back from the dead.

a 1990 helae Michel Crichton gove the das of enviring entiret species a shelly plausible and enormously entertaining such such as the state of the such as the state of such as the state of the such as the state of \$1.20 years on hundreds of aintail genome engeneed was therefore the state of the state of \$1.20 years on hundreds of aintail genome to the first time, the genome of something undoubtedly chariumatic and definitively state of the state state of the state state of the stat

This a Bir bet that a complete gen boody related species would aske it easier to pull a Cichion on a mammoth than on a dinosure. But easier is far from easy. To put Resh on the bones of the latest sequence — to go from a genome to a living, breathing seast — would require you to consider the very least, the folowing stees defining exactly

want for your creatures; synthesizing a full of chromosome from these requesces; engai ing them in a nuclear envelope; transfer into that nucleas into a neg that would support and getting that egg into a womb that won carry it to term. None of those tespis current possible. From getting a definitive sequence har waiting eggs from nelephant there and the full control of the second of the second of the but-finaumountable obstacles at every stage. d no evidence that anyone is going work very hard to solve them. But any of them actually make the sum impossible?

The sequence The first stop in t

> lenge is to obtain a sequence good enough for us contemplate using it as the basis for alriving being. The sequencing of long-dead DNA such that of mammosh use fragments at various weeks of degradation. To detect and correct the sus-pair changes that can occur after death some pair changes that can occur after death and to avoid the inevitable errors involved in assembling million of these timp fragments into a coherent requence, it is inconsury to sequence

the order of 12-bit doverage

Say Swante Pailso, director of
the genetic department at the
Max Planck Institute for Evoluticnary Anthropology in Leip
zig, Germany, who has works
under hall genome 'The
some published today has reughly 0.7-60.

The content and produce of the content of the
some published today has reughly 0.7-60.

coverage. Reasonable quality for science does not mean the sort of genome you would want to live with: in a human genome that error rate would mean 300,000 mutations. Coverage can be improved as long as there?

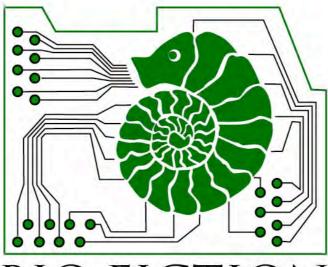
Coverage can be improved as long as there's the money to do it, but old samples offer particular challenges: a lot of contamination by bacterial, fungal and other species DNA. Thirty-five-fold coverage, whi Piäbo saysisas good as it gets, wor be "extremely costly and extreme time-consuming," according Eske Willerslev, head of the Ancie DNA and Evolution Group at the

chapter sequencing, however, and the possible 1; yo fetter perserved and prepared supples, mean that those expenses of cost and time will havile. Willnet-leven nothing to sup presentsers from producing a mammoth genome us good as any genome body at some point in the second producing to the produce of the enough for allving-being termina as done orbot good question—but with time and effort; tilplassable that a sufficiently error-free genome can be arrived at ...

A requence on incompla, irrot cough researcher will add to such out or exactly ho in divides up into chromosome. The other process of the divides up into chromosome. The other chromosome is not not be a supplementation of the chromosome in an intext remember of all a sift through the genomic data locking for the spinning and endings. But even the very bet mammoth material falls short of this index processes of the chromosome in the chromosome in the chromosome chromosome chromosome chromosome in the chromosome

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