Terminator Genes and GURT - Biological Restrictions Management

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Attac working group on the knowledge commons

Credits for some of the slides: Ricarda Steinbrecher, EcoNexus, UK

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What is the Problem?

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Evil pirates in the digital domain

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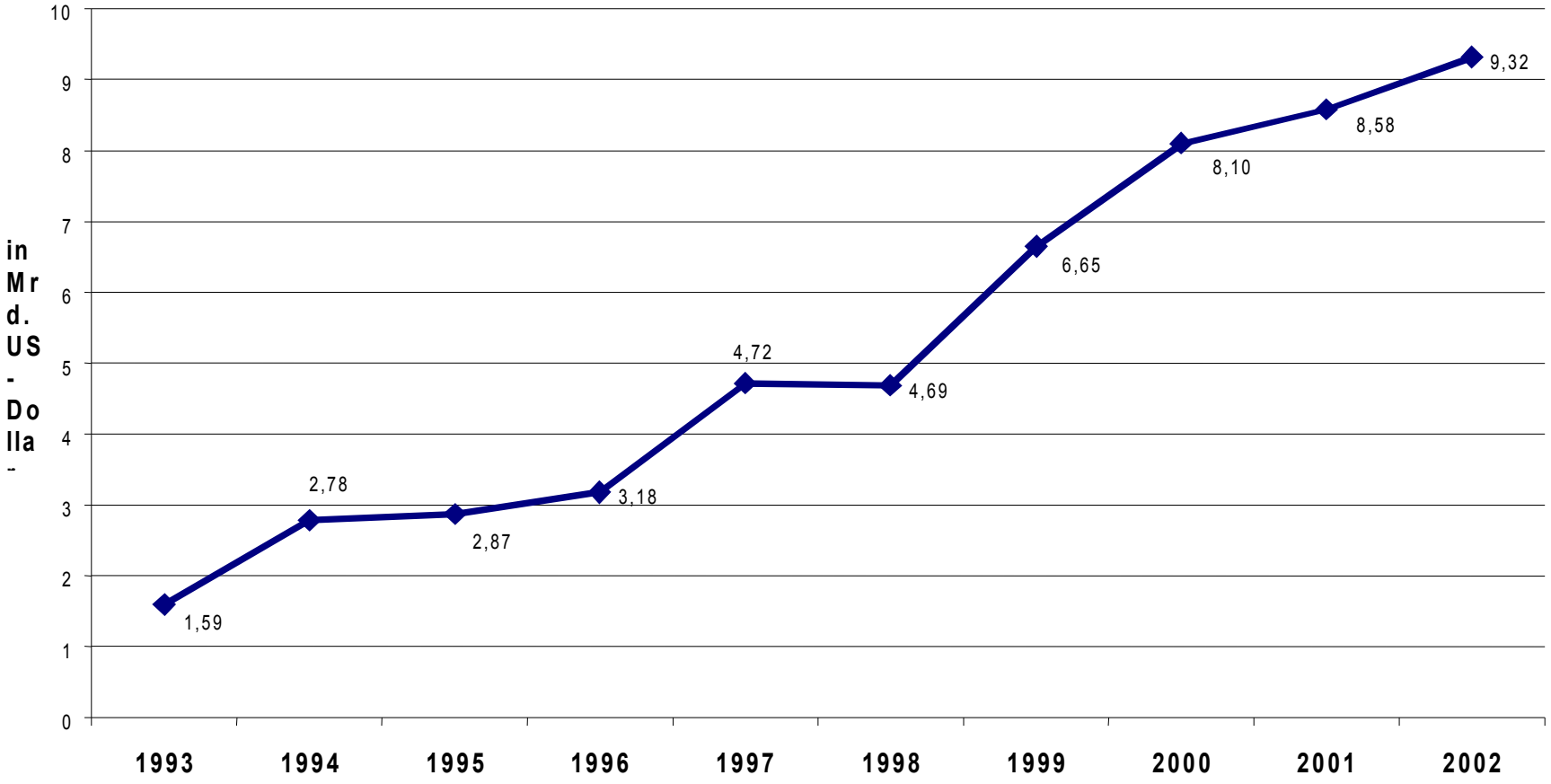
The Problem

- We (the seed industry) invented potato, rice, wheat, corn
- Sorry: **patented**
- Now farmers use their own harvest to make seeds – How many?
- -> 50% in Germany, 90% in developing countries!
- This is ancient, this is breeding independence, limits profits!

Net payments of the countries with low and medium income for license fees and royalties



Quelle: World Bank, World Development Indicators 2004, eigene Berechnungen

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The solution: Law?

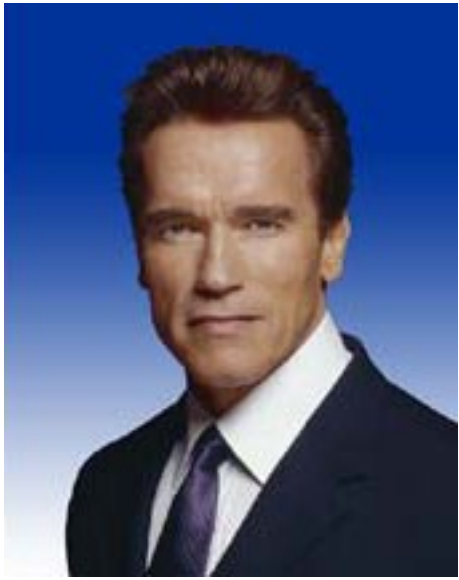
- WTO-law: TRIPS
  - Cool, but still leaves space for farmers privileges
- National laws
  - Even better but, need enforcement
  - In Germany: Nachbaugebühren.
- We even got a prize for that!

BIG BROTHER AWARDS.de

Saatgut Treuhandverwaltungs GmbH, Bonn,
vertreten durch Geschäftsführer Dirk Otten

The solution: Biological Restrictions/Rights Management

- No further enforcement necessary
- Learning from the music industry
- BRM, aka. Genetic use restrictions technology (GURT) or Terminator technology
- Terminator Genes allow the production of seeds that grow normally, but produce dead seeds
- Farmers cannot regrow!



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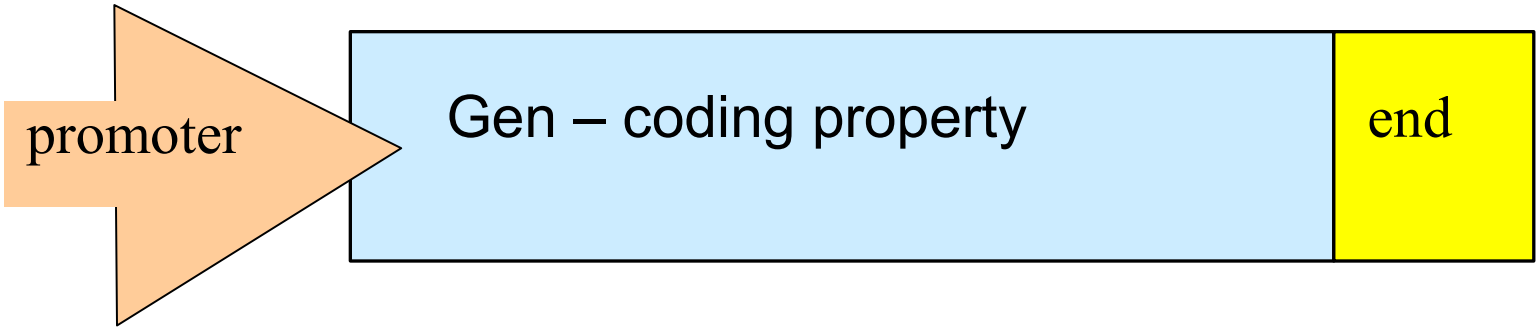
The Technology: a cool hack!

- Not so simple: We have to grow seeds, while the farmers must not!
- We are trying for many, many years now
- Dozens of patents

Gene Construct



Regulatory sequence: switch on/off - e.g. CaMV (virus)

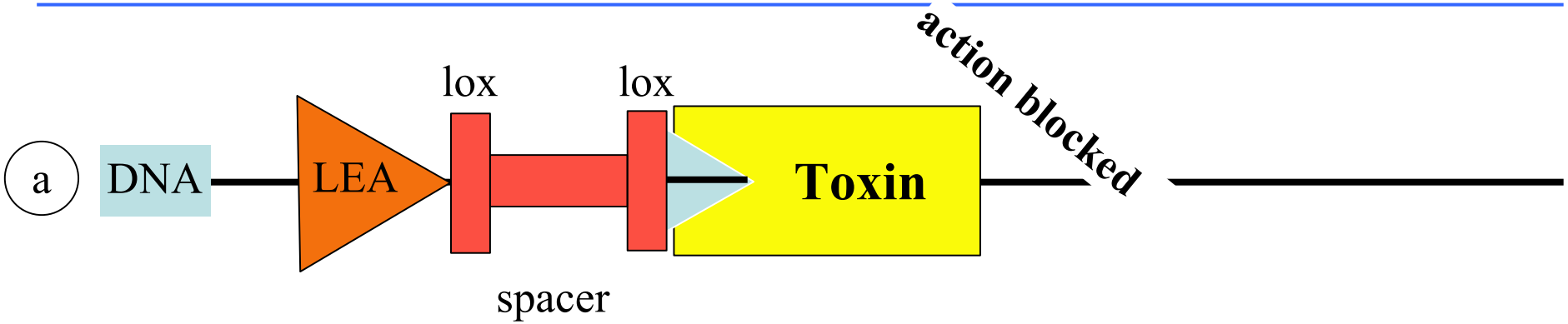
Coding sequence of the gene - e.g. *pat* gene for herbicide resistance (taken from a soil bacterium)

Regulatory sequence: Termination - e.g. Taken from a pea

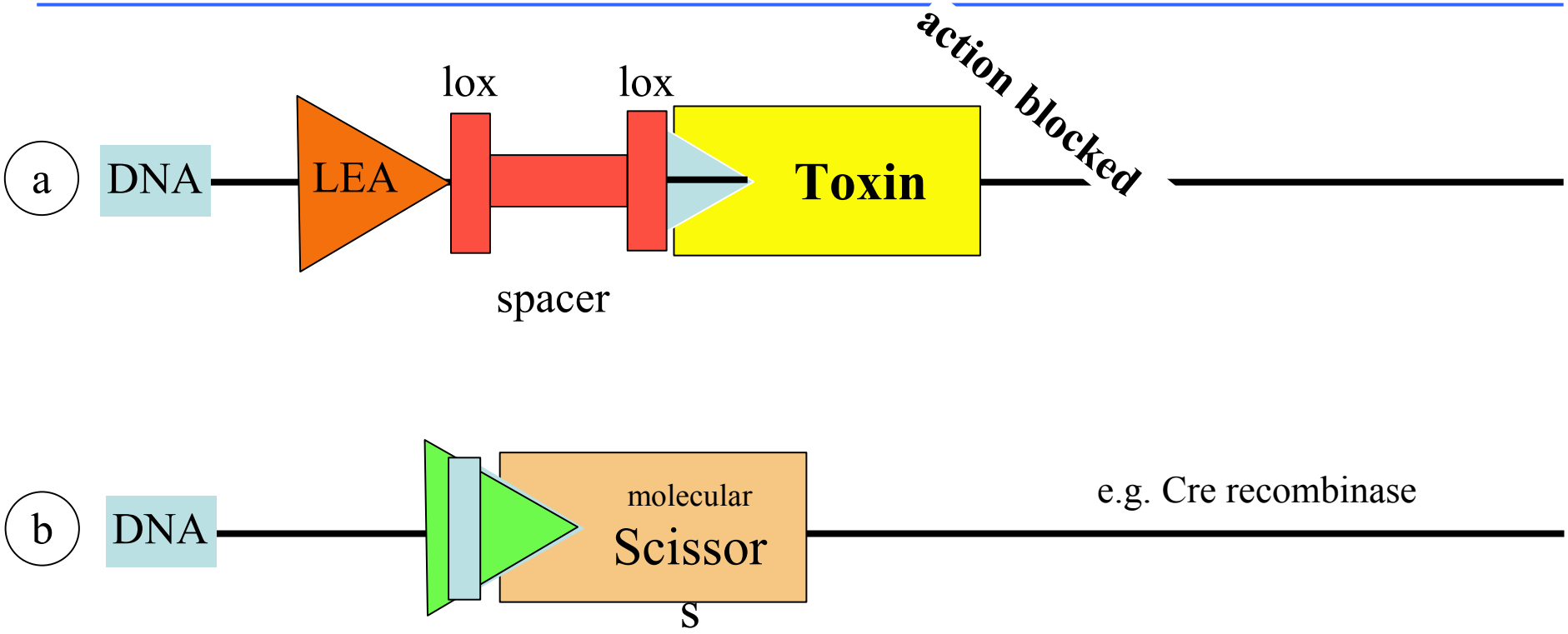
Gene construct = function

```
void produce toxin()
// this is the promoter
{
      // genetic property
      mk_herbicide_resistance();
} // this is the end sequence
```

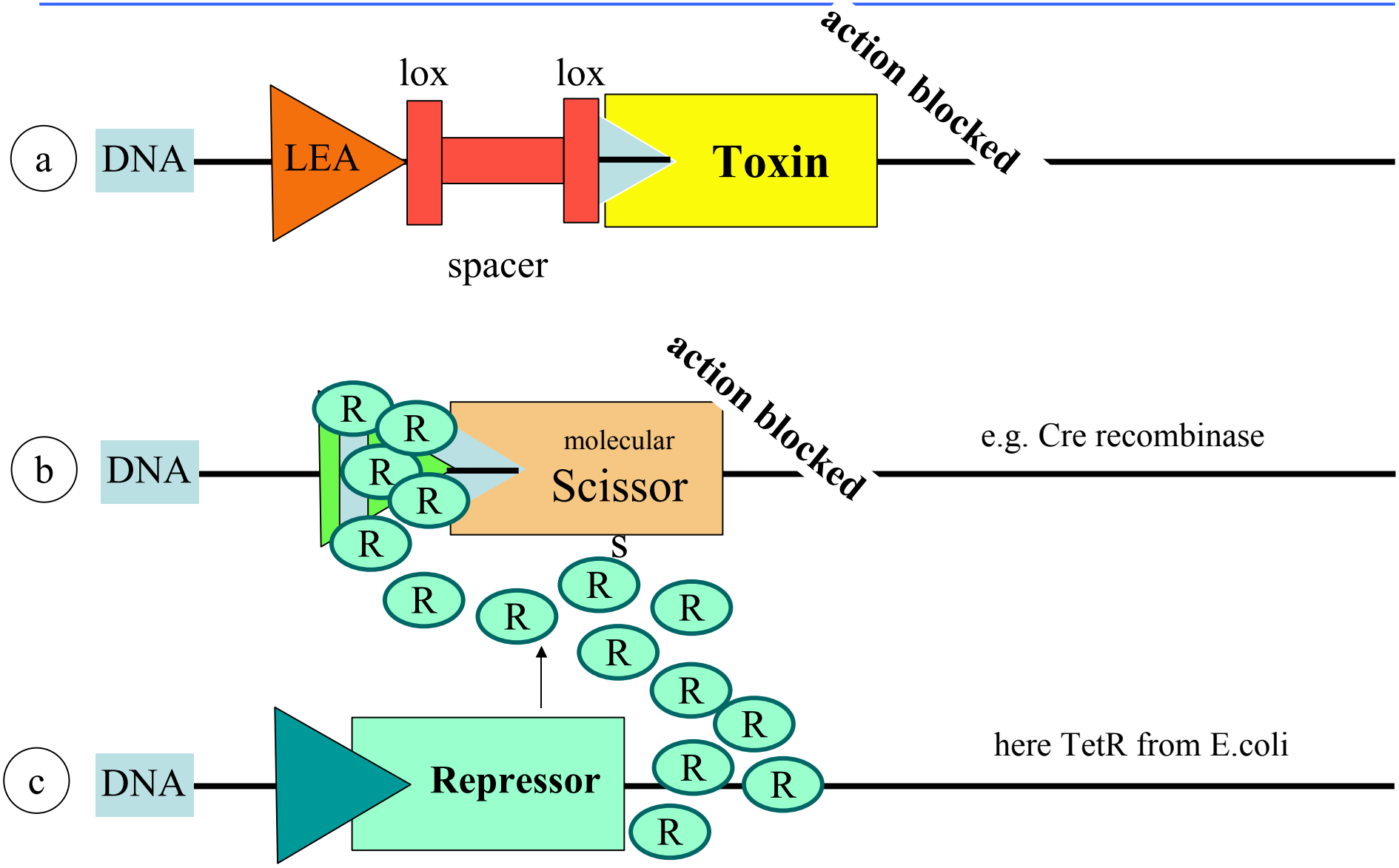
Terminator: molecular Components(1)

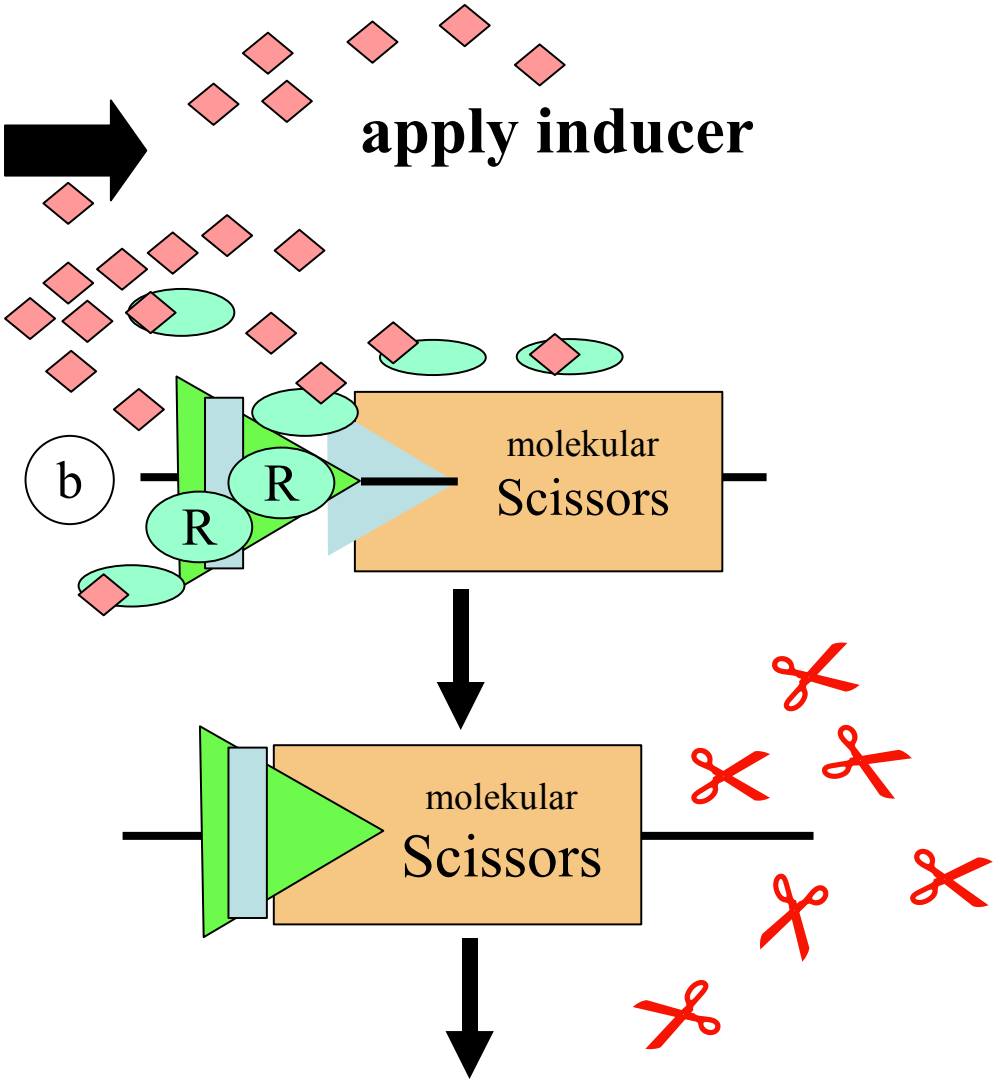


Terminator: molecular Components(2)



Terminator: molecular Components(3)

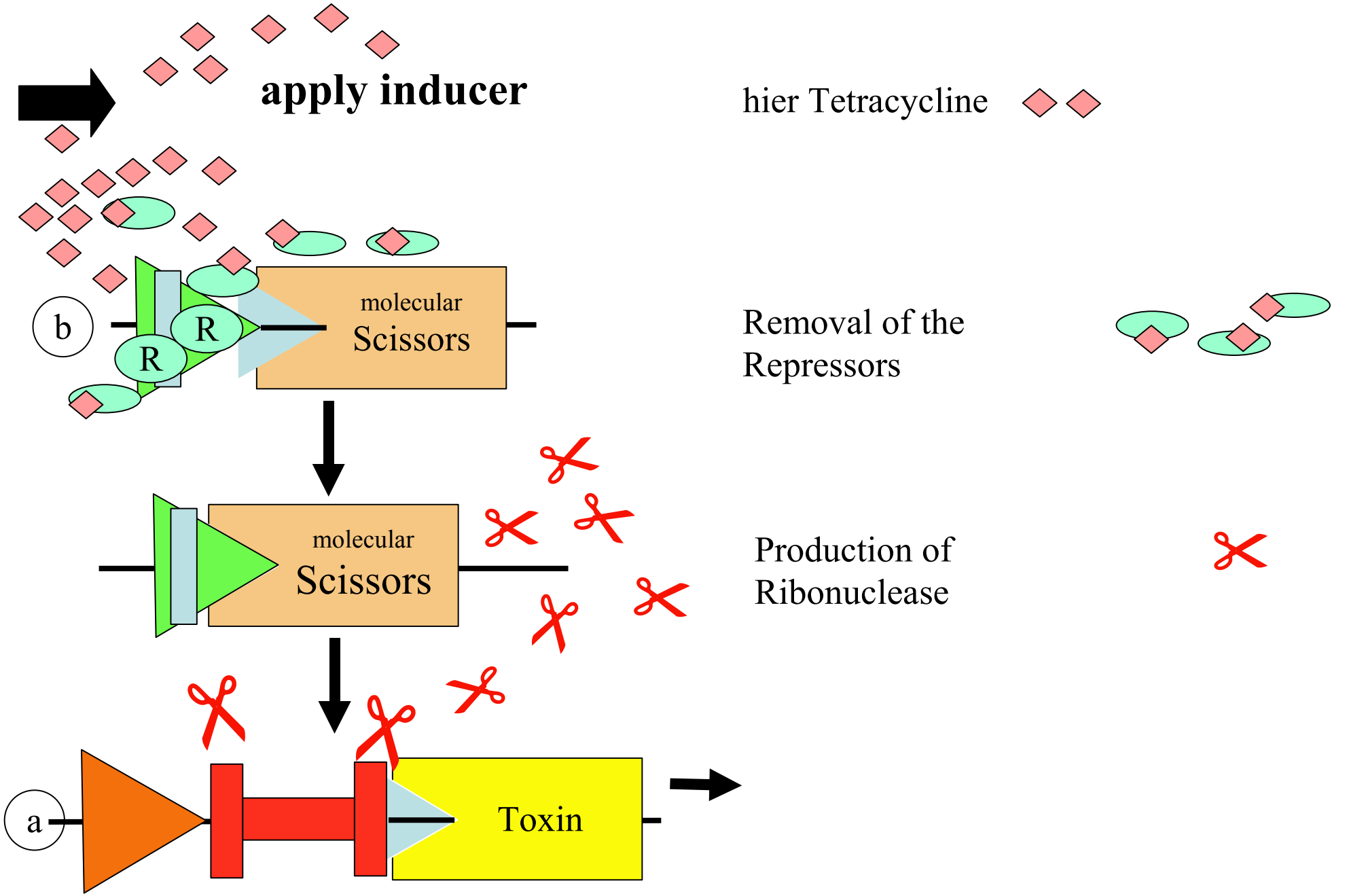


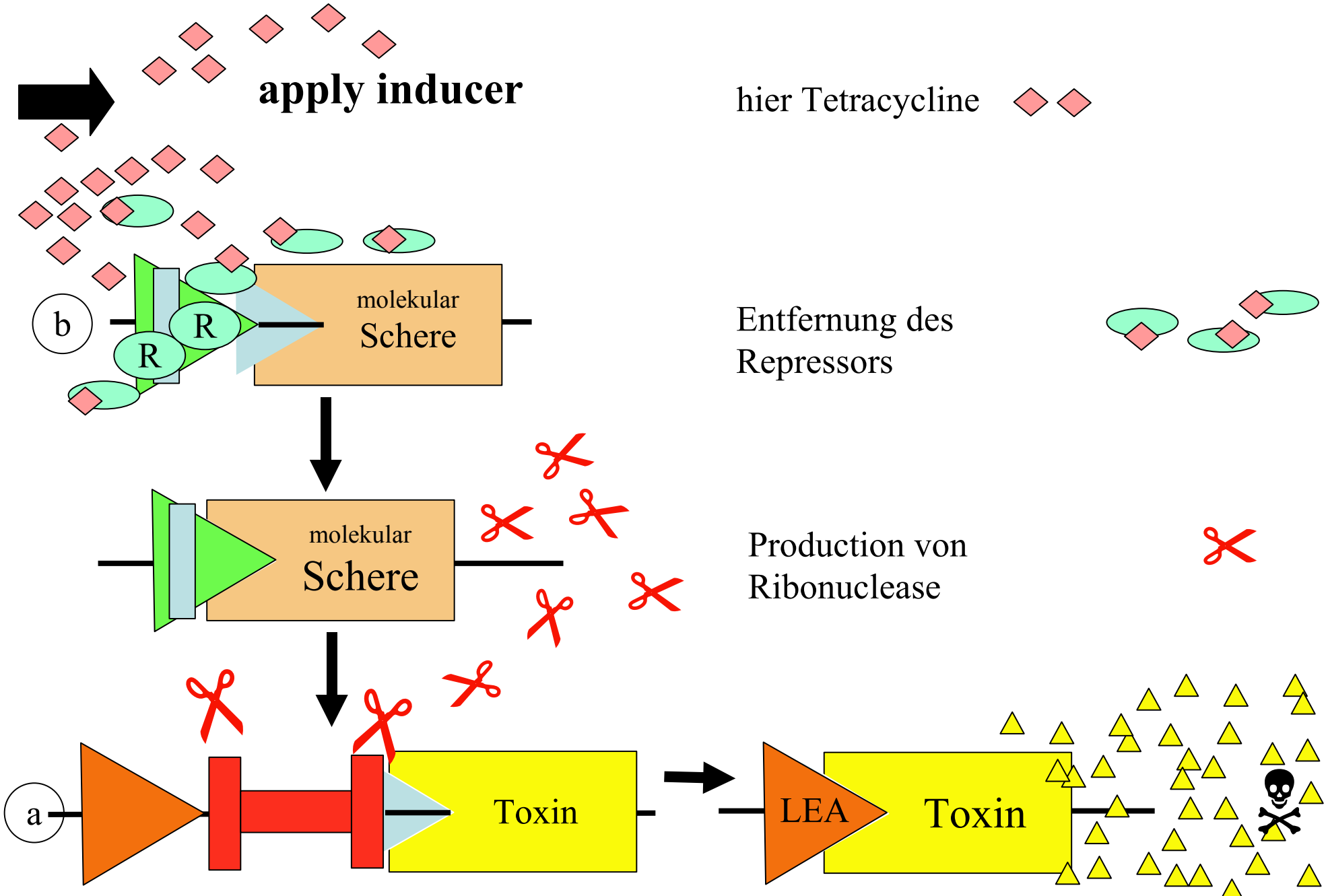


here: Tetracycline

Removal of the
Repressors

Production of
Ribonuclease


apply inducer
hier Tetracycline
b
R
R
molecular
Scissors
Removal of the
Repressors
molecular
Scissors
Production of
Ribonuclease
a
Toxin


apply inducer
hier Tetracycline
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R
R
molekular
Schere
Entfernung des
Repressors
molekular
Schere
Production von
Ribonuclease
a
Toxin
LEA
Toxin

Terminator in Pseudo Code

```
spacer = 1;
assert(no_mutation && enough_repressing_toxin &&
everything_else_correct);
while (spacer == 1) {
   reaction = wait_for_reaction();
   if (reaction == 1) {
     produce_ribonuclease();
     spacer = 0;
   }
  }
produce_sterilizing_toxin();
```

Terminator Howto

1. Grow your genetically improved variety
2. After the harvest: pour Tetracycline over the seeds
   - They will genetically modify themselves
   - DO NOT forget this!
3. The peasant can grow normally, and just before harvest the seedling commits suicide

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Rhetoric-Howto

1. Use „V-GURT“ instead of Terminator or BRM
2. Use gene-scare, say Terminator can protect from GMOs
   - This does not work, since the technology is not working reliable enough, but hey ;-)
3. Talk about hunger, not pesticide resistance
4. Agree to a moratorium until the technology is ready

Political development

- 2000: Quasi moratorium in Convention on Biological Diversity (CBD)
- Now Canada, New Zealand, Australia push for an end. (US is not party)
- In January in Granada, Spain: „8j-Working group“
- March in Brazil, Conference of the Parties (COP8) of the CBD
- What is our government doing?

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TERMINATOR-TECHNOLOGIE ÄCHTEN!

So far in Germany 23 Organisations are founding the ban terminator-Campaign Germany

amongst them:

Attac, BUND, Brot für die Welt, Umweltinstitut München e.V., AbL, Genethisches Netzwerk

BUKO Kampagne gegen Biopiraterie, BUKO Agrar Koordination

Bioland, Demeter, Naturland, share e.V.

www.freie-saat.de

www.banterminator.org

What can you do?

- Subscribe to banterminator-Mailinglist: mailto:krueger@attac.de
- Join the campaign
- **Help with the web page (www.freie-saat.de)**
  - **Layout**
  - **Texts**
  - **Coding**

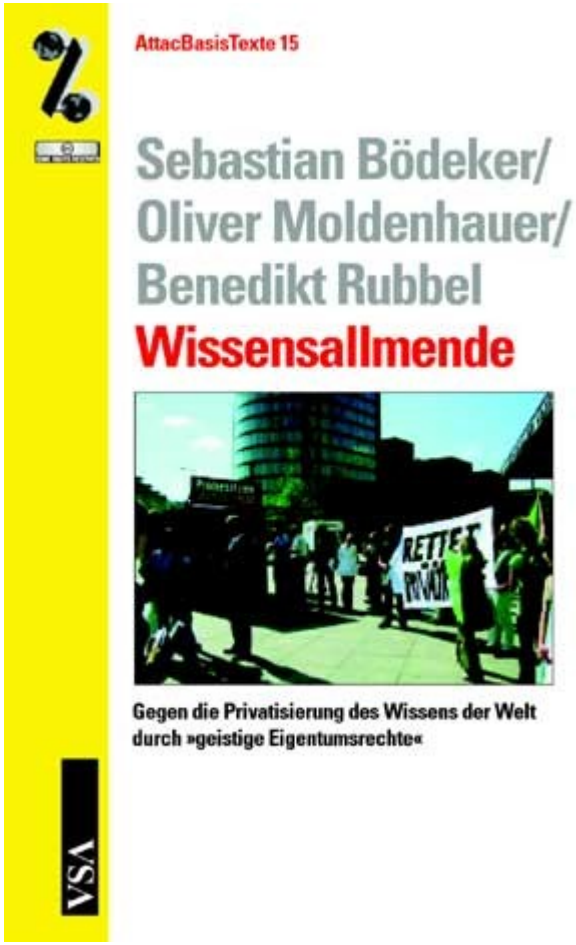
Contact:

Oliver@attac.de

www.banterminator.org

www.freie-saat.de

Basistext Wissensallmende



Sebastian Bödeker / Oliver Moldenhauer / Benedikt Rubbel

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