

## Epigenetics – beyond the gene dogma

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## Background

- the central gene dogma: "one gene codes for one protein"
- is outdated as in the last years the understanding of the regulation of the genome has altered fundamentally
- but genetic engineering of organisms still based on this dogma

## **Genetic engineering still based on the gene dogma**

Unintended changes – method inherent - regularly occur in GM plants but are not adequately depicted in the relevant literature because

- the questions posed in published studies are usually framed very narrowly
- plants with undesirable effects or poor performance are often rejected in the laboratory

## **Epigenetics – A new paradigm?**

Epigenetics – some definitions:

- a self-organising regulatory network co-determined by signals from the environment
- the process by which a genotype gives rise to a phenotype
- the study of effects which can be passed on mitotically and/or meiotically and cannot be traced back to a change in DNA

## Brochure



# Risk Underestimated

Interviews with nine scientists  
on the subject of  
genetically modified plants

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## Outcomes of the conference

- suggestions on what kind of testing should be performed for a risk assessment
- address the need to establish an alternative food safety network

## Suggestions for the risk assessment

Far reaching proposals by Cesare Gessler:

- only species own DNA, own promoters, no selection genes
- defined insertion site that is targeted at non-coding regions and substitutes a particular DNA sequence of the plant (“gene therapy”)

## Suggestions for the risk assessment

Less far reaching suggestions:

- thorough characterisation on the molecular level
- characterisation of the transgenic insert(s) after modification
- for the phenotypic characterization: data from at least 3 years and at least 6 locations that represent different environmental conditions

## Suggestions for the risk assessment

As for food safety:

- animal feeding tests over 90 days obligatory

For GM plants designed to contain pesticides that they absorb and/or produce, toxicity tests according to 91/414/EWG:

- tests on mammals, during 3 months on 3 species, 1 year on one species, 2 years on another one (generally rat)

Thank you for your attention!