



Reflections on upstream uncertainty research: challenges in the light of an old dilemma

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Overview

- Why this talk?
- Upstream issues
- If nano-ethics is “speculative”, what about Upstream Uncertainty Research (UUR)?
- Collingridge’s dilemma: information vs. entrenchment
- UUR challenges in a situated perspective
- Can (or should) we identify conditions for when UUR can or should be done?



Contextualizing upstream

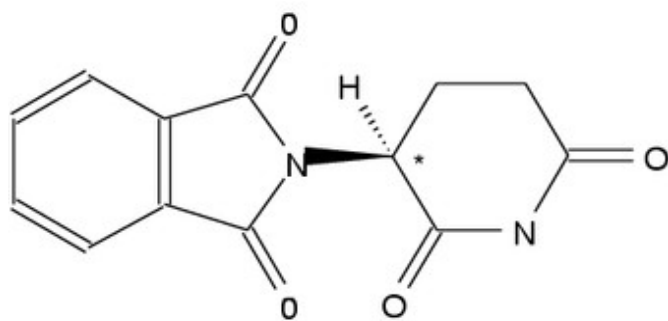
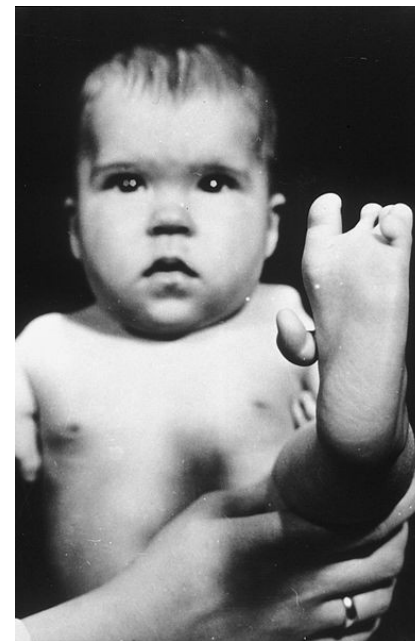
- A new “social contract” (Gibbons 1994) with science?
- From Mode-1 to Mode-2 (Nowotny et al 2001; 1994)?
- Socially robust vs. reliable knowledge
- Science – society dialogue/interaction
- Upstream engagement with science and technology vs. “end of pipe”
- Reflective challenges for STS

For and against ethical speculation (ESP)

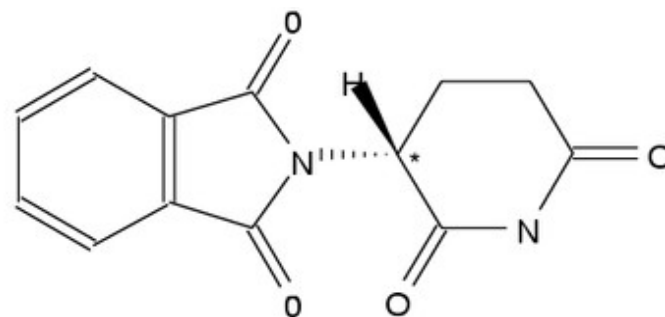
- Nordmann and Rip (2007, 2009) warn against over-investing in “speculative nano-ethics”
- The new gap: ethics is leaping ahead of nanotechnology!
- Roache (2008) defends ESP:
 - Speculation: a philosophical technique
 - ESP to avoid unethical “squandering” of S&T resources!
 - Focus on present/likely S&T projects vs. a long term view

Is the case for “speculative uncertainty” issue dependent?

- Some hazards are general
 - can drugs pass the placenta barrier?
- Other hazards are specific
 - Can thalidomide enantiomers have different effects?



Enantiomère (S) : tératogène



Enantiomère (R) : Non-toxique

Collinridge's (1980) dilemma

Horn 1. Upstream intervention:
information problem (why and how to intervene?)

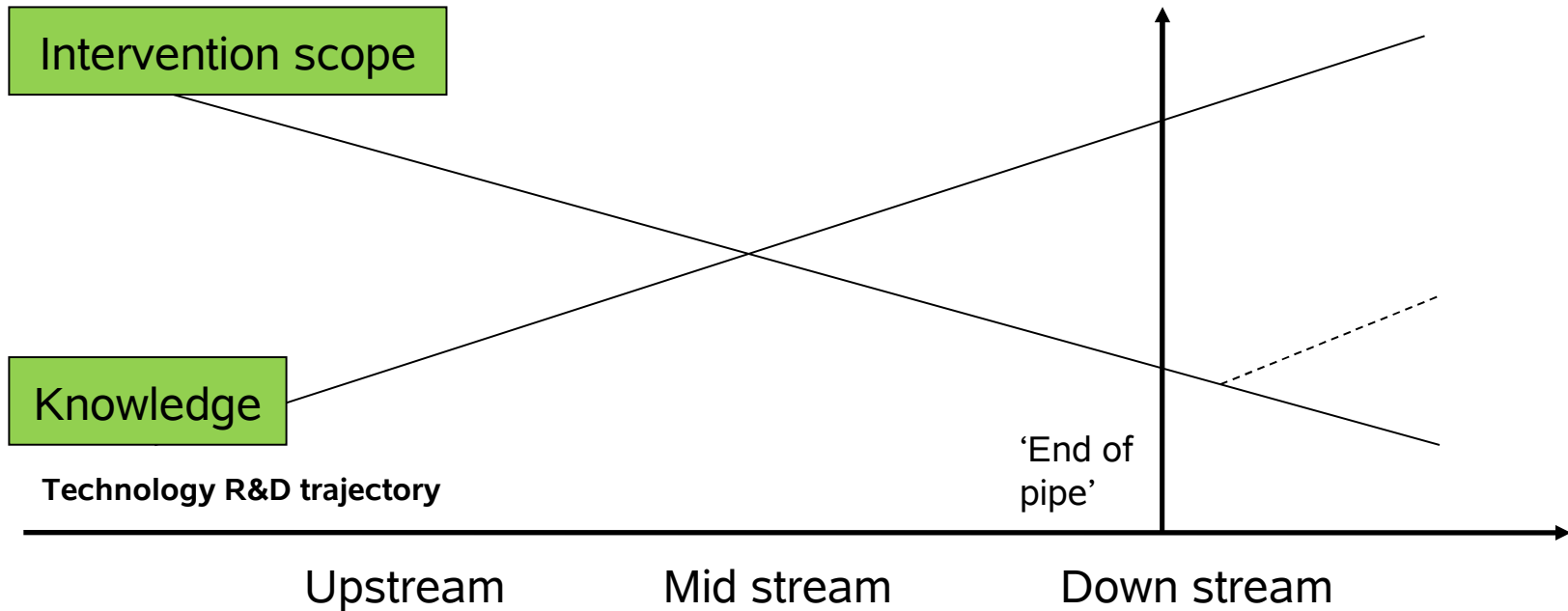
Horn 2. Downstream intervention:
Control problem:

Entrenchment or increasing inertia of socio-technical networks (scope for intervening)



Conceptual model of Collingridge's (1980) dilemma:

scope for intervening vs. knowledge of how and why



Visions?..explorations?..specific research projects?.. technological product?..in use?..

Vision
Assessment

Constructive
Technology
Assessment

Midstream
Modulation

Technology
Assessment

Later
Technology
Assessment

NANOTRUST:

Expertise and ethical conditions for a socially robust introduction of nanobiotechnology in aquaculture

- Proposed and designed by Bjørn Myskja and Anne I. Myhr
- Collaboration between:
 - NTNU, department of philosophy
 - GenØk
 - FISHVACCPLAT
- 3-year project (2008-2011)
- My role: 2-year post-doc



What motivates NANOTRUST?

- Trust-worthiness and social robustness: How?
- Much "nano" talk tends to be too general and/or too speculative
- A mundane nano-case
- Upstream engagement with science/technology development vs. "end of pipe"

NANOTRUST: research questions

1. What are identified as potential benefits, risks and scientific uncertainties of nanotechnologies?

Case: Nanoparticles for delivery of salmon vaccines

2. How is nanotechnology shaped in a social and temporal setting?
3. What kind of transparency is appropriate re nanotechnology?
4. How to foster a trust-worthy relation between nanoscience and society?

Uncertainty Research: more than risk

Risk: Structural relationships modelled and quantified. Risk = Exposure * Hazard

Inexactness: Structural relationships modelled but not quantified exactly

Indeterminacy: outcomes not pre-determined or pre-determinable

Ignorance: Don't know what we don't know

Ambiguity: Framing ambivalences

Elicitation of Expert Views on Uncertainty

- Conceptual basis in Walker and Harremoes (2003)
- Operationalized by Von Krauss (2004)
- Aims:
 - Support policy making / research prioritization
 - Enhance transparency/communication of uncertainty
 - Enhance Learning

Walker & Harremoes et al (2003): Structured approach to uncertainty analysis

- Location
 - system model
- Level
 - Continuous knowledge scale from “determinism” to “total ignorance”
- Nature
 - Epistemic/variability
 - Reducible/irreducible
- Sensitivity

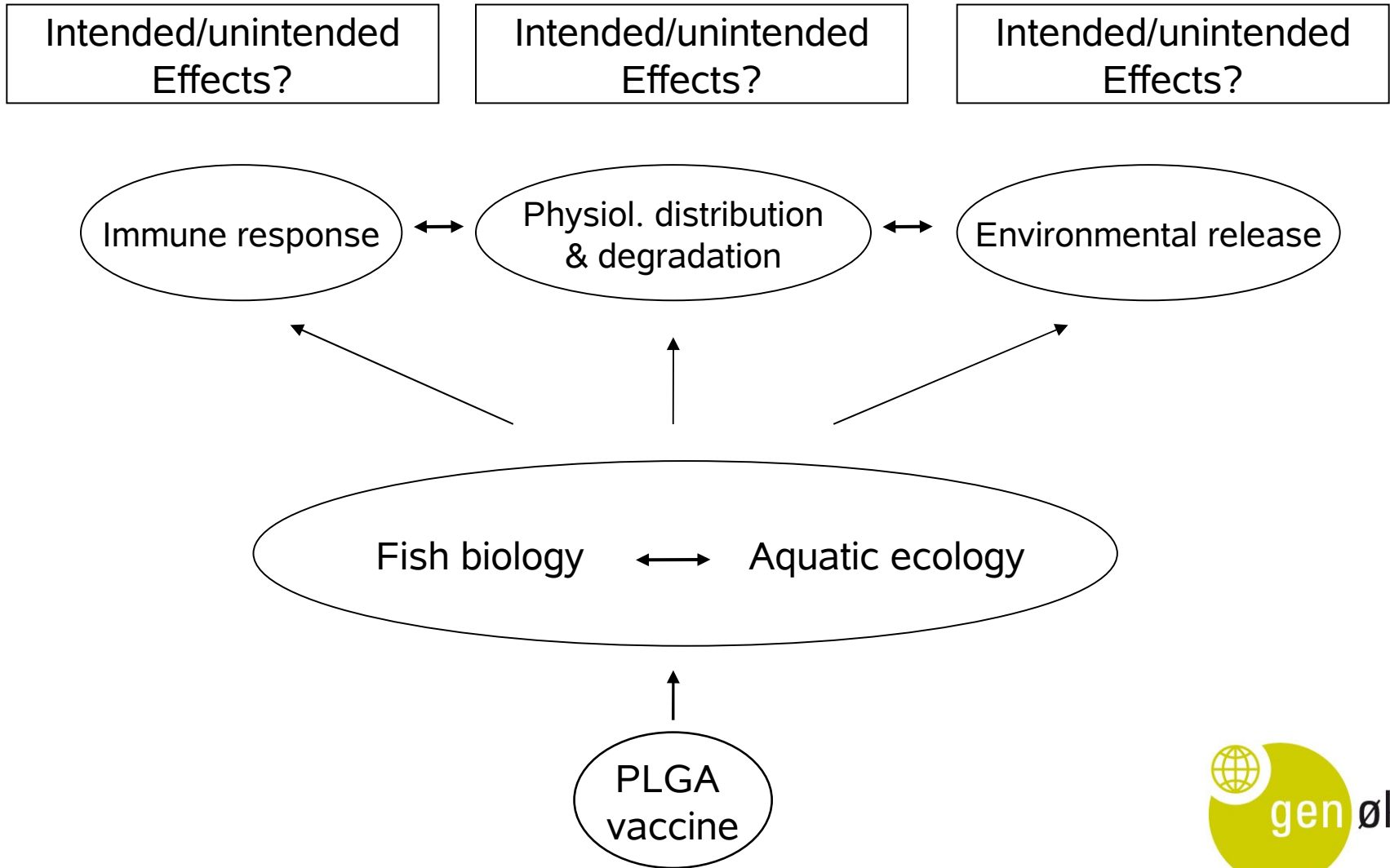
Expert Elicitation of Uncertainty

Examples

- Uncertainties re GM oilseed crop (v. Krauss et al 2004)
 - A commercial GMO product
 - Uncertainty re an official risk assessment
- DNA vaccines for aquaculture (Gillund et al 2008)
 - Promising technology
 - One DNA vaccine approved
- Transgene silencing (v. Krauss et al 2007)
 - developing GE technique, risk assessed in EU
- Question: Can uncertainty be studied further upstream?

RQ 1: Elicitation of Uncertainty

Location, Level, Nature and Sensitivity



Risks, benefits and uncertainties of PLGA NP salmon vaccines: Resources?

Literatures relevant to the specific vaccine project:

- PLGA
- Fish-immunology and fish vaccines
- Salmon aquaculture
- Nanotechnology issues

BUT: No paper on PLGA fish vaccines!

Risk governance landscape re veterinary vaccines:

- Institutions, legal framework
- Authorization procedures
- Guidelines for risk assessments of fish vaccines ,...

BUT: No risk assessment / decision on PLGA fish vaccines!

Interviews with experts (of related fields):

- Vaccine developers
- (Eco)toxicologists
- Regulators

BUT: No experts on PLGA fish vaccines outside the FISHVACCPLAT project!



Challenges for upstream uncertainty research

- “Data” are limited upstream (dilemma horn 1) re:
 - Specific (interviewable) expertise
 - Published scientific literature
 - Risks assessments
 - Public articulations
- Incitement related problems:
 - Why uncertainty analyses before we know a) the object? and b) If it will be proposed?
 - Who will support or publish?
 - PLGA does not appear very risky
- Info access barriers: IP and such

UUR motives and possibilities

- UUR rationales (avoid horn 2) may be *precautionary, ethical or resource economic*
- *Experimental* UUR (e.g. toxicology)
 - Nourished by knowledge gaps
- *Social science* UUR:
 - Information limited
 - Depend on cooperation across disciplines
- Can a trading zone be created?
- Mode-1 vs. mode-2 dependent?

Uncertainty research: Some interlinked questions

When:

- Upstream-downstream re R&D trajectory?

What:

- Look for “risk/problem markers” when deciding on cases?
- Specificity (e.g. PLGA based vaccines or PLGA *nano-particle* based *salmon* vaccines)

Who:

- Disciplinary background(s); academic identities

Why:

- Precaution? Intervention? Enhance learning? STS research?
Mode-2 facilitation?

Two strategies:

- Develop guidelines - or stick to anarchy!



How to help?

- Can my ideas on UUR challenges carry a paper?
How?

And/Or:

- How to proceed with RQ1?

The End

Thank you for listening

