

**Nanotechnology:  
The next asbestos?  
Government fails to protect  
and denies our right to  
choose**

**Dr Kristen Lyons  
School of Biomolecular and Physical  
Sciences,  
Griffith University**

- Sunscreens contain nano zinc (30%) and nano titanium (70%) (2006)
- What's wrong?
  - Nanoparticles can produce free radicals that damage DNA, especially with UV exposure
  - Nano zinc is absorbed through skin and reaches blood and urine in humans
  - Inhalation caused inflammation of mice lungs, crossed placenta of pregnant mice, and resulted in behavioral changes in baby mice
  - nano zinc oxide more toxic to human colon cells (than bulk form)
  - *"the worst case scenario, I suspect, could be development of cancer. But we don't know. That's what we're trying to find out"* Dr McCall, CSIRO.

# Lessons from that hot summer - what I will discuss tonight...

- The genie is out of the bottle - we are already exposed to nanomaterials
- Lack of regulation and labeling fails to protect public health and the environment, and citizens right to know
- Australia lags behind in nano-regulations
- There are strong calls internationally for a moratorium
- citizen action will be imperative to shape the future of this science - 'Australian Cancer Council' (and others) withdrawal of nano sunscreens

# Nano food and farming

- Manufactured nanomaterials are already used in some food products, nutritional supplements, many packaging and food storage applications and some agricultural inputs (e.g. fertilizers and pesticides)
- Global agri-food companies investing in nano: Nestle, Kraft Foods, Unilever, Cargill, Pepsi-Cola, Syngenta, Monsanto

Between 150-600 nano foods  
and 400-500 nano food  
packaging applications are  
already on the market

(Cientifica 2006; Daniells 2007; Helmut Kaiser  
Consultancy Group 2007)

By 2010 it is estimated that sales of nano  
foods will be worth almost \$6 Billion  
(Cientifica, 2006)

# Nano - From Farm to Fork

## Nutritional supplement drink:

nano iron drink mix for toddlers  
offers increased bioavailability  
(Toddler Health)

## Food contact material: nano silver

baby mug with increased  
antibacterial properties (Baby  
Dream)

**Food packaging:** Cadbury Chocolate and Miller Beers also employ nano packaging/containers. (Carbon nano tubes to detect toxins/food spoilage)

**Food additives:** nano capsules of water insoluble substances are used to increase absorption in the body, (Tip Top Up)

**Plant Growth Treatment:** PrimoMaxx nano emulsion (Syngenta) and 'gutbuster' microcapsules

# Failure to regulate, test and label

- Currently no nano-specific regulations to oversee research, manufacture, commercial application, and disposal of nanotechnologies,
- No comprehensive labeling
- This will exacerbate health and environmental problems and citizen mis-trust
- National Nanotechnology Strategy Taskforce (2005), National Enabling Technologies Strategy (2009)
- Patchwork of non-nano specific regulations:
  - *Therapeutic Goods Administration (TGA), Food Standards Australia New Zealand (FSANZ), National Industrial Chemicals Notification and Assessment Scheme (NICNAS) and Australian Pesticides and Veterinary Medicines Authority (APVMA)*
- “truck-sized loopholes” that enable unfettered development of nanotechnologies
  - Nano is new, but not treated this way
  - Mass thresholds, nano don’t trigger regulations

# Australia out of step with international trends

- EU Parliament's Environment Committee - bans nano foods (May 2010)
- The European Union's Food Safety Authority recognises that some nanomaterials can pose serious new health and environmental risks, although there are still many serious knowledge gaps
- UK's Royal Society and Royal Academy of Engineering recommended nano-ingredients should be subject to new safety assessments and face mandatory product labelling
- House of Lords Report (2010) – criticises industry secrecy around the use and development of nano foods. Warns that health risks of nano foods remain poorly understood.

- Organic food movements ban nano food (Australia, Canada)
- Over 40 union groups calling for moratorium on manufacture and use of nano materials
- Surveys have shown that accurate food ingredient labelling, including in relation to nanotechnology and GM, is very important to Australians
- Despite rhetoric of 'public engagement', communities being kept in the dark, key stakeholders excluded from engagement activities and limited transparency related to policy making processes

# Health and Safety Concerns

- Introduce new set of health and safety hazards
  - Nanoparticles more chemically reactive than larger particles
  - Nanoparticles have greater access to our bodies than larger particles
  - Greater bioavailability and greater bioactivity may introduce new toxicity risks

# Environmental Concerns

- Nanomaterials bring new and unexpected forms of pollution
- Size, dissolvability and other novel characteristics enable them to readily contaminate soils, waterways and food chains
- Nano-silver: highly toxic to rat liver and brain cells; toxic to aquatic and terrestrial organisms, further increasing bacterial resistance; potential to contaminate water, interfering with beneficial bacteria, further contamination downstream on agricultural land, landfill sites etc.
- In short, negative impacts for entire ecosystems (RCEP, 2008)
- Nanoparticles can bio-accumulate: carbon nanotubes are taken up by microbial communities and root systems, concentrating up food chain (RCEP, 2008)
- TiO<sub>2</sub> can cause organ pathologies, respiratory distress in rainbow trout and can be toxic to algae and water flees, especially under UV light
- Nano Zinc also toxic to algae and water flees
- Nano agrochemicals more potent, possibly more toxic even though smaller quantities used.

# Taking Action

- The genie is out of the bottle - we are already exposed to nanomaterials/nanoparticles etc.
- The failure of Australia's regulatory system is in breach of citizens fundamental right to know, and is failing to protect public health and the environment
- International calls for a moratorium and a precautionary approach (Friends of the Earth, ETC Group)
- There is an urgent need for community education and democratic development of nano policy and regulations

# Taking Action

- Ask for safety testing and labeling of nano products to give people informed choice
  - [Nicola.RoxonMP@aph.gov.au](mailto:Nicola.RoxonMP@aph.gov.au)
- Make a late submission to the 'Review of National Food Labeling' to support mandatory labeling
  - [Mark.Butler.MP@aph.gov.au](mailto:Mark.Butler.MP@aph.gov.au)
  -
- Friends of the Earth Australia Nanotechnology Project  
<http://nano.foe.org.au/>