Ministry of Environment and Food of Denmark
Environmental Protection Agency

EU Regulatory Perspective – Pesticides

OECD/EFSA Workshop on DNT: the Use of Non-Animal Test Methods for Regulatory Purposes, Bruxelles 18-19 October 2016

Susanne Hougaard Bennekou

Organophosphate metabolites in urine samples from Danish children and women

Measured in the Danish DEMOCOPHES population

Thit Aarøe Mørck[1]
Helle Raun Andersen[2]
Lisbeth E. Knudsen[1]

[1]University of Copenhagen
[2]University of Southern Denmark

145 women and 144 Children - 2011
Detectable concentrationen of OP metabolites in 90%
More than 4 different metabolites in 30%

Concentration (nmol/L)		GM [95% CI]	Median (p95)	Spearman's ρ
DMAP	Children	57.7 [48.2-68.4]	59.5 (318)	0.121
	Mothers	45.5 [37.9-54.3]	50.7 (245)	
DEAP	Children	35.9 [30.8-41.7]	37.8 (150	0.107
	Mothers	29.6 [25.1-34.5]	29.8 (135)	
DAP	Children	**111 [96.7-126]***	106 (387)	0.086
	Mothers	**84.8 [72.7-98.2]**	92.3 (386)	
Creatinine corrected (nmol/g creatinine)				
DMAP	Children	**60.4 [49.5-72.5]***	63.5 (378)	**0.228****
	Mothers	**47.3 [39.8-55.5]**	48.2 (251)	
DEAP	Children	37.5 [32.4-43.6]	39.3 (151)	0.091
	Mothers	30.8 [26.9-35.2	31.6 (122)	
DAP	Children	**116 [99.8-133]****	106 (515)	**0.203***
	Mothers	**88.1 [77.6-100]**	81.9 (286)	

Geometric means (gm) with 95% confidence intervals (ci), medians and 95 percentiles of the summed metabolites dmap, deap and dap in children (n=144) and mothers (n=145). The correlation coefficient speaman's rho is shown for correlations between mothers and children. Values below lod were set to lod/√2, dap was calculated as the sum of deap (sum of diethyl alkylphosphates): dep+ detp and dmap (sum of dimethyl alkylphosphates): dmp+dmtp. Significant differences between mothers and children by paired t-test and significant correlations measured by spearman's rho are marked in bold. * Significance level p<0.05, ** significance level p<0.01.

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Context

Levels comparable to the rest of Europe
BUT higher than in the US (CDC data)

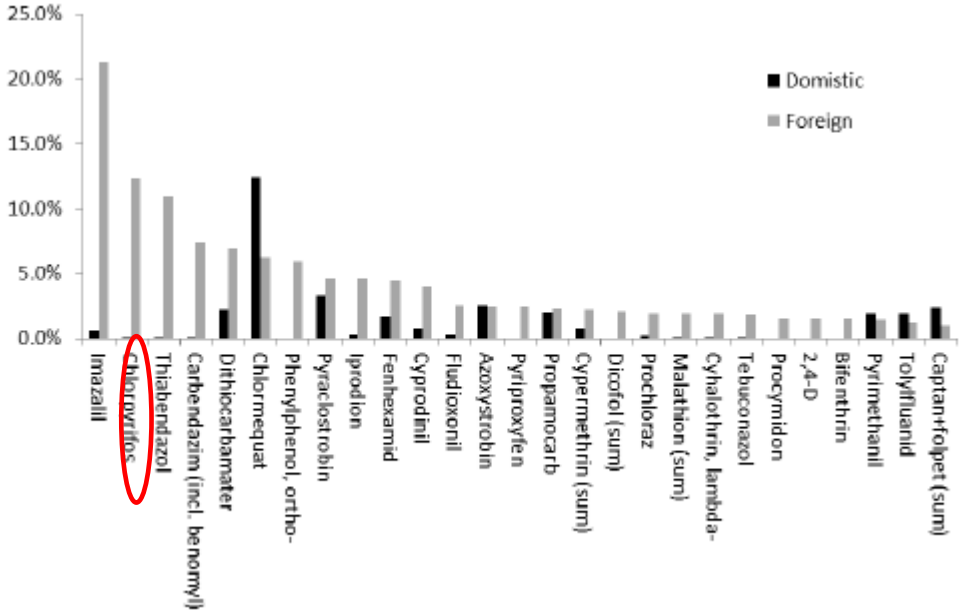
Source?

Very few OP's authorised for pesticide and biocide use in DK
Most likely source: Food not produced in DK

Pesticide Residues

Results from the period 2004-2011

DTU Fødevareinstituttet



Hazard Quotient below 1%

The fact that OP metabolites are found in the urine is not equal to an unacceptable risk

Status 2015

Still the most frequently found OP

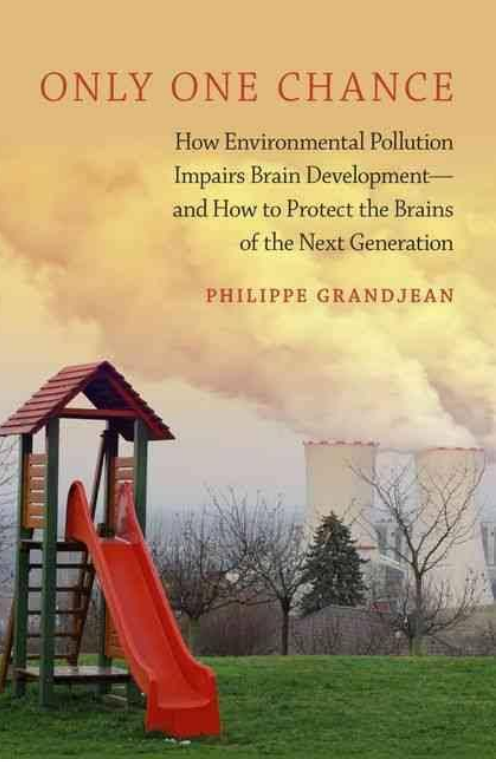
The ADI was lowered and consequently MRL's

The exposure is expected to decline

Cumulative Risk?

The total exposure of OP's does still not pose an unacceptable risk

Case Closed?



"In longitudinal birth cohort studies based on the CHAMACOS-cohort and residents of New York City, maternal exposure to chlorpyrifos and other organophosphate insecticides in pregnancy was associated with neurobehavioural deficits in the children at least through 7 years of age (Bouchard et al. 2011; Eskenazi et al. 2007; Marks et al. 2010; Rauh et al. 2011; Rauh et al. 2006)."

The levels in DK/EU are above the "adverse effects levels in the US".
"Thus, studies of potential adverse health effects related to organophosphate exposure in European populations are needed".

MEDIA

Forskere slår alarm: Høj mængde pesticider hos danske børn

Hjalte Kragesteen | 18. maj 2016 kl. 7:10 | 9 kommentarer

Print

Landbrugets tunge ansvar: Masser af sprøjtemidler i danske børn

Udgivet maj 18, 2016 | Af Kjeld Hansen

NY RAPPORT: Koncentrationen af pesticid-rester i urinen hos danske børn er alarmerende højt, mener forskere på baggrund af en ny undersøgelse. De frygter blandt andet, at flere vil udvikle ADHD. Men Miljøstyrelsen ser ingen grund til panik. Det skriver Altinget.dk 18. maj

Professor Philippe Grandjean ser med stor bekymring på de høje niveauer af sprøjtegift-rester i danske børn urin.

Danska barn har ”alarmerande” höga halter bekämpningsmedel

abc nyheter

Debatt: «Var årsaken til bankkrisen»

Dødstallene i Middelhavet stiger

SISTE | NYHETER | PENGER | LIVET | MOTOR | REISE | DATALIV | VIDEO | VÆRET | A - Å

Bolig og interiør | Familien | Mat og drikke | Mote | Trening | Helse | Tester

Sprøytemidler funnet i barneurin

Oral Hearing of Minister in Parliament – June and September 2016

It is important that we as a society protect the coming generation against damaging substances. This is done by research, risk assessment and establishment of safe reference values

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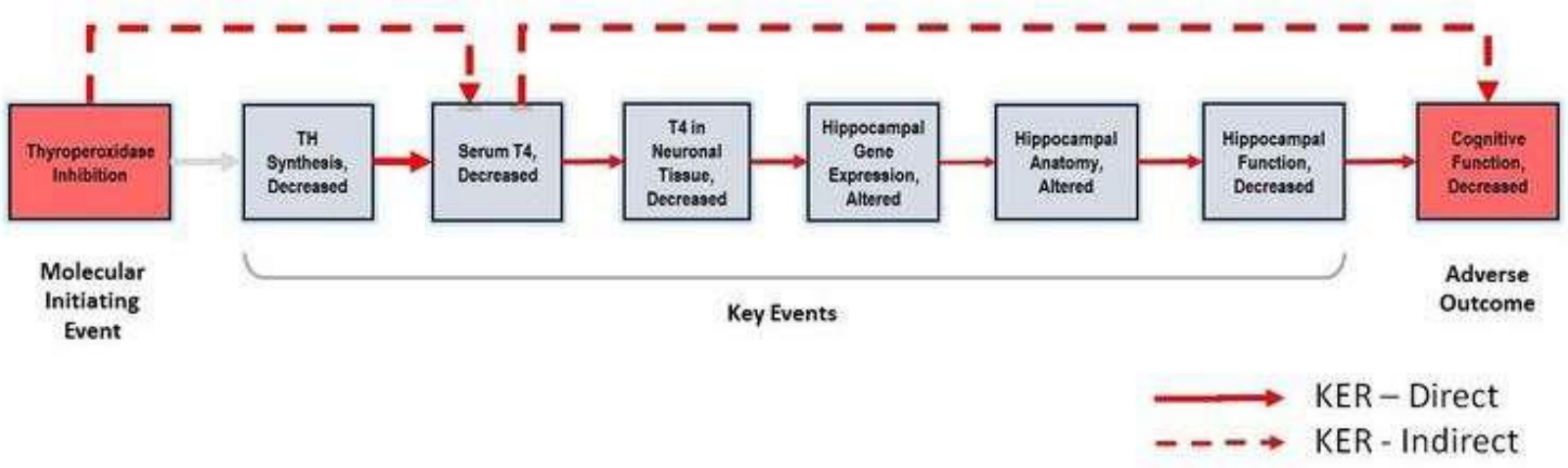
Other Angles?

Under Review

AOP42: XENOBIOTIC INDUCED INHIBITION OF THYROPEROXIDASE AND SUBSEQUENT ADVERSE NEURODEVELOPMENTAL OUTCOMES IN MAMMALS (INHIBITION OF THYROPEROXIDASE AND SUBSEQUENT ADVERSE NEURODEVELOPMENTAL OUTCOMES IN MAMMALS)

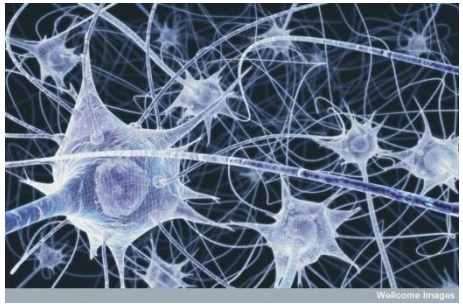


Under development

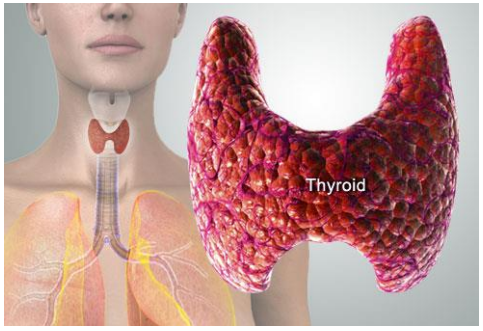
- **AOP134: SODIUM IODIDE SYMPORTER (NIS) INHIBITION AND SUBSEQUENT ADVERSE NEURODEVELOPMENTAL OUTCOMES IN MAMMALS**
- **AOP54: INHIBITION OF NA+/I- SYMPORTER (NIS) DECREASES TH SYNTHESIS LEADING TO LEARNING AND MEMORY DEFICITS IN CHILDREN**
- **AOP8: UPREGULATION OF THYROID HORMONE CATABOLISM VIA ACTIVATION OF HEPATIC NUCLEAR RECEPTORS, AND SUBSEQUENT ADVERSE NEURODEVELOPMENTAL OUTCOMES IN MAMMALS**
- **AOP152: INTERFERENCE WITH THYROID SERUM BINDING PROTEIN TRANSTHYRETIN AND SUBSEQUENT ADVERSE HUMAN NEURODEVELOPMENTAL TOXICITY**

Grouping of Pesticides for Cumulative Risk Assessment

287 chemical active substances were screened

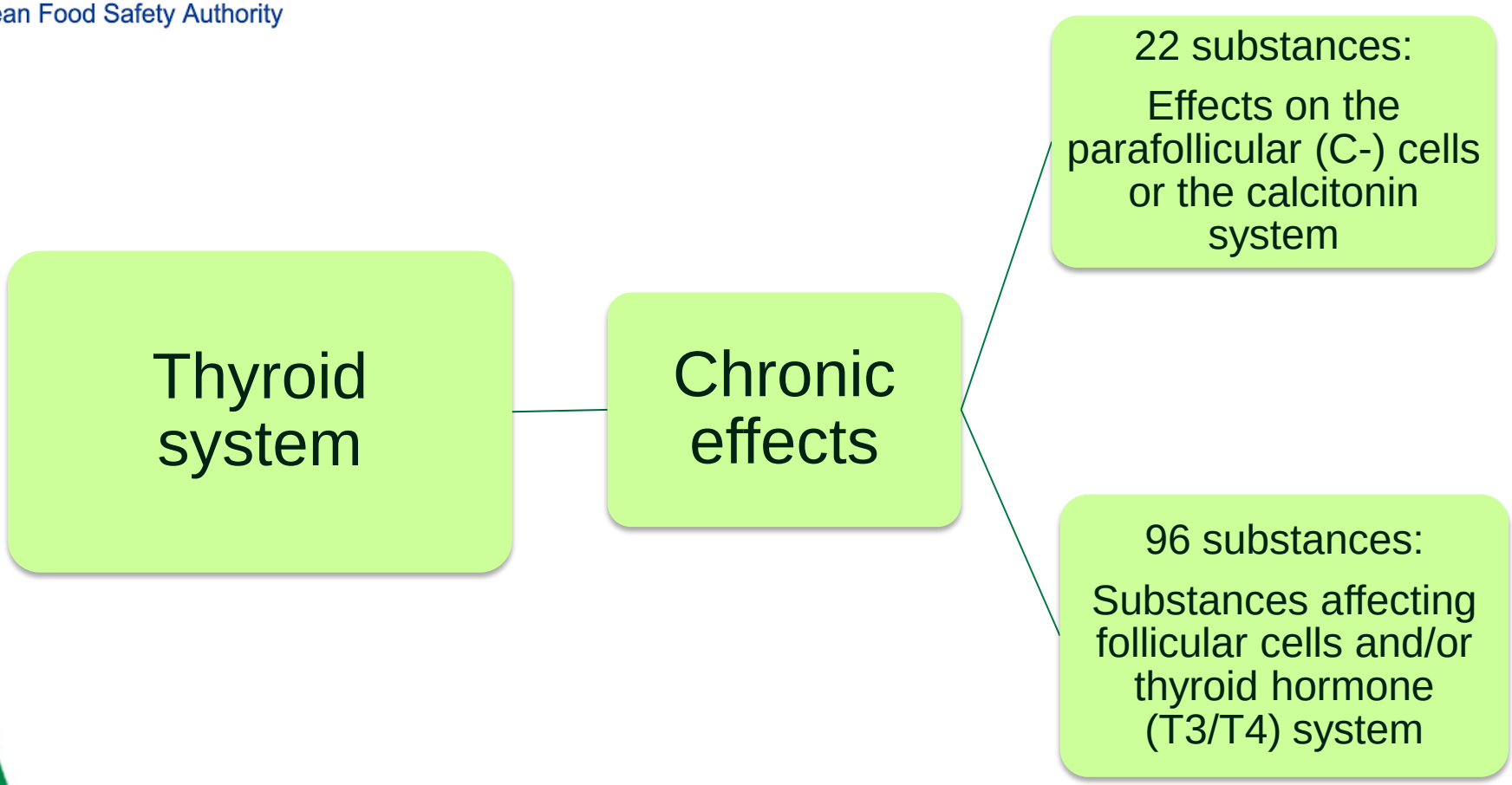


Nervous system
(65 substances)



Thyroid system
(101 substances)

Effcts on the thyroid system



European Food Safety Authority

EFSA Journal 2013;11(12):3471

Scientific Opinion on the developmental neurotoxicity potential of acetamiprid and imidacloprid[1]

EFSA Panel on Plant Protection Products and their Residues (PPR)[2, 3]
European Food Safety Authority (EFSA), Parma, Italy

The PPR Panel encourages the definition of clear and consistent criteria at EU level to **trigger** submission of mandatory DNT studies, which could include development of an **integrated DNT testing** strategy composed of robust, reliable and **validated *in vitro* assays and other alternative methods complementary to the *in vivo* TG 426 for assessing the DNT potential of substances.**

Thank you for your attention!

Welcome

Dr. Roland Solecki, BfR