Endocrine Active UV Filters: Developmental Toxicity and Human Exposure

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http://www.greentox.org

Developmental Toxicity of 4-MBC and 3-BC in Rats: Selected Endpoints

Conventional LOAEL: Violet Molecular LOAEL: Yellow	4-MBC (mg/kg/day)				3-BC (mg/kg/day)				
	0.7	**7**	**24**	**47**	**0.07**	**0.24**	**0.7**	**2.4**	**7**
Male Puberty		**Delay**	**Delay**	**Delay**		Ø	Ø	**Delay**	**Delay**
Prostate: Neonatal Duct nos. / volume Adult Ventral Lobe rel. weight	 Ø Ø	 ↑ ↓	 ↓	 ↓	 Ø Ø	 Ø ↓	 Ø	 Ø	 Ø
Adult Prostate: mRNA/prot. Androgen Receptor, DP Androgen Receptor, VP **Down-regulation by E2** in VP N-CoR protein, DP No-CoR protein, VP	 Ø/Ø Ø/Ø ↓ Ø	 ↓/Ø Ø/(↓) ↓ ↓ (↓)	 ↓/↓ ↓/↓ ↓ (↓) ↓	 ↓/↓ Ø/- 		 ↑/↓ ↑/↑ ↓ Ø	 Ø/↓ ↑/Ø ↓ Ø	 Ø/- ↑/- 	 ↑/- Ø/-
Estrous Cycle Female Sexual Behavior		Ø ↓	Ø ↓	Ø 		**Irreg.**	**Irreg.**	**Irreg.** ↓	**Irreg.** ↓
Adult Female Brain: VMH Progesterone Receptor mRNA		↓	↓	↓		↑	Ø	↓	↓
Postnatal: Female VMH Morphogenetic Gene nkx2-1 Growth Factor IGF-I	 ↑ Ø	 (↑) Ø	 	 	 Ø ↑	 Ø ↑	 	 	
Thyroid Rel. Weight **Male/Fem.** Triiodothyronin (T3)		↑/Ø Ø/Ø	↑/↑ ↓/↑	↑/↑ ↓/↑					

Human-Milch Studie NRP50

Warum Humanmilch (HM)

1.) HM erste Nahrung für Neugeborenes; HM – Chemikalien – Rückstände = Chemikalienbelastung nach der Geburt
2.) HM – Rückstände ähnlich mütterlicher Chemikalienbelastung in der Schwangerschaft, daher = (±) Chemikalienbelastung vor der Geburt

Human Milk Study NRP50:

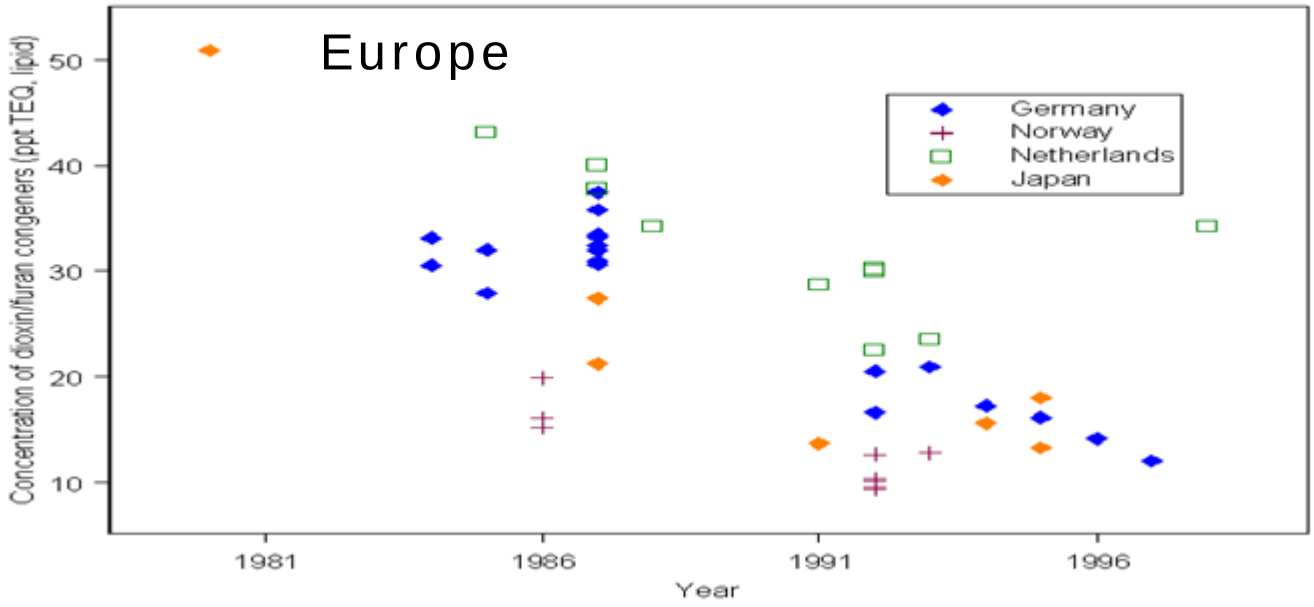
- **Pilot Study:**
  Summer/Fall 2004
  13 mother/child pairs
- **Study 1 :**
  Summer /Fall 2005
  21 mother/child pairs
- **Study 2 :**
  Summer/Fall 2006
  20 mother/child pairs

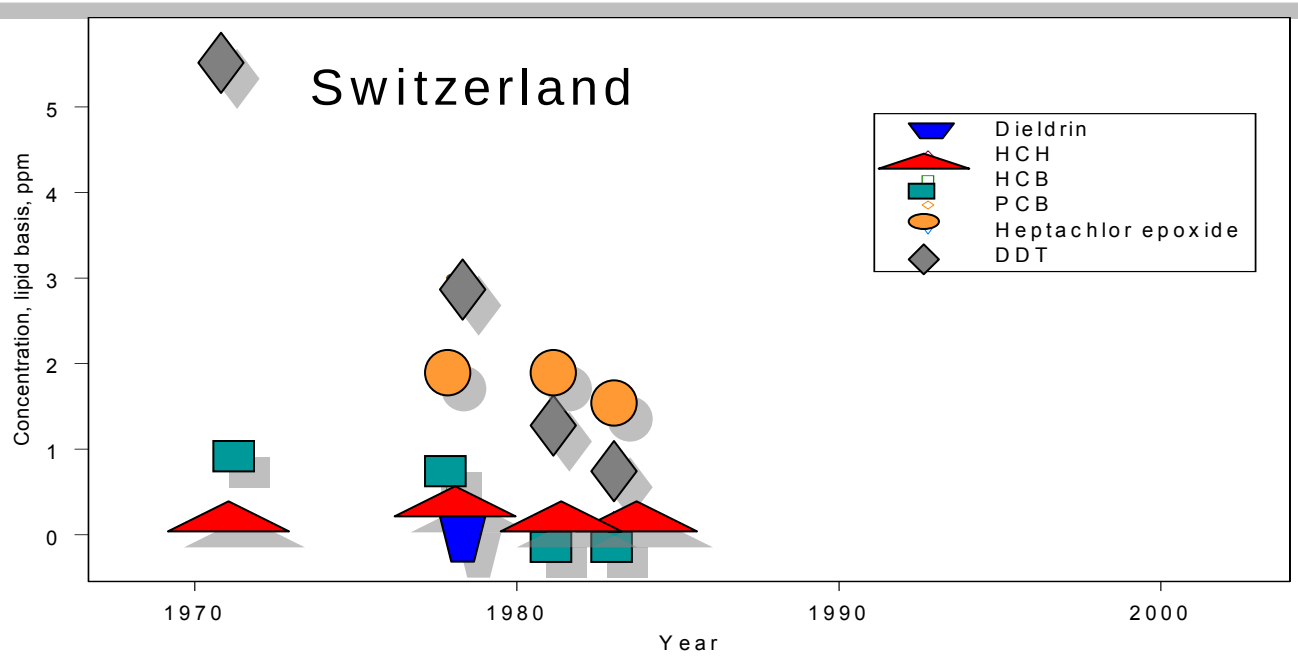
- **University Hospital, Basel**
  Dr.I.Hösli,
  Dr.C.Vökt
- **Ethic Committee:**
  University Hospital
  Basel
  Prof. Dr. H. Kummer
- **Study Nurse**
  Monika Birchler
- **Nursing Adviser**
  Silvia Honigmann

Gewicht von Mutter und Kind

Mutter Alter	**Mutter Gewicht*** vor der Geburt	**Neu-geborenes Gewicht***	**Studie**
34.23 ± 6.68	78.46 ± 11.84	3.554 ± 0.449	Pilot Study
32.67 ± 4.33	72.71 ± 5.33	3.307 ± 0.366	Study 1
32.50 ± 5.01	79.65 ± 14.36	3.440 ± 0.530	Study 2

Human milk pollution





LaKind et al.
EHP, 2001

Fremdstoffe in der Humanmilch

Alte Rückstände 1940-1980

Organochlor Pestizide

DDT / DDE

Organophosphat Pestizide(Chorpyrifos)

PCB`s

Elemente : Pb, Hg, Cu, Al etc

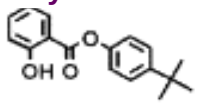
Neuere Rückstände: **wichtig: Hormonaktive Chemikalien!**

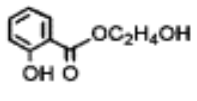
Wie z.B. UV Filter **aus** Cosmetics/ Sunscreens

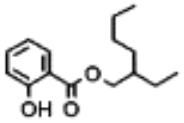
UV Filters: Absorbance of UV-A or UV-B Radiation by Chromophores

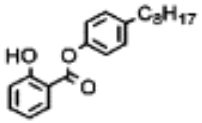
absorbing in the UV- A, B and C - Range from 400 – 320nm (A), 320 – 280 nm(B), <280 nm (C)

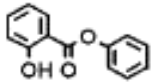
Salicylates

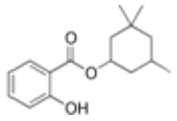

BuPh-Sal


HEt-Sal

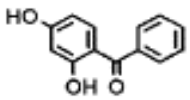

EtHx-Sal

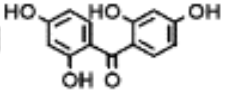

OPh-Sal

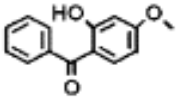

Ph-Sal

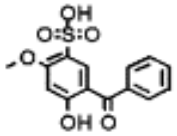

Homosalate HMS

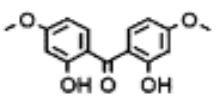
Benzophenone Derivatives

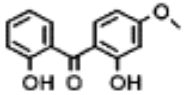

BP-1

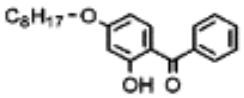

Bp-2


Bp- 3

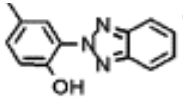

BP-4

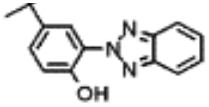

BP-6

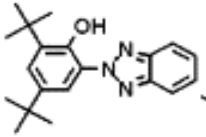

BP-8

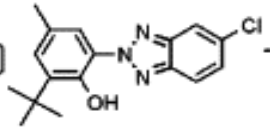

BP-12

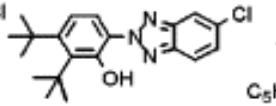
Benzotriazoles

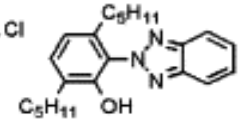

UV-P


BTAH-A

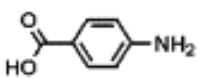

UV-320

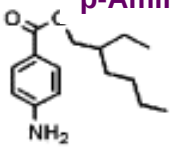

UV-326

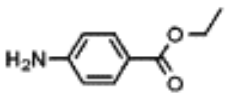

UV-327


UV-328

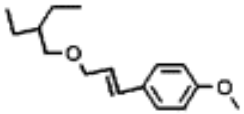
Derivatives of p-Aminobenzoic acid

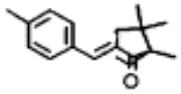

PABA

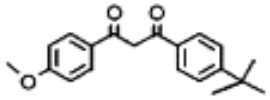

OD-PABA

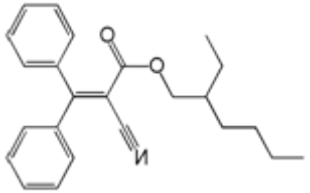

Et-PABA

Others


Ethylhexylmethoxycinnamat


4-MBC 4-methylbenzyliden campher


Bu-MDM


Octocrylene

Increased conjugation and increased substitution of the UV Filter - molecules will increase the wavelength of absorbance

Mixtures of filters will cover and protect from a wider range of UV radiation

Cosmetic sunscreensca.30

UV light Absorbers used to protect from UV: plastics,tools, carpets, clothing
No declaration!

Use of Different Cosmetic Products (Brands) by Pregnant and Lactating Women (2004, 2005, 2006)

Cosmetics potentially containing UV Filters	Pilot Study	Study 1	Study 2
Skin Care	46	43	67
Perfumes	10	8	14
Deodorants	12	12	13
Sunscreens	8	3	11
Hair Dyes	6	3	1
Lipsticks	9	13	8
Make up	14	11	20
Total	106	93	134

UV-Filters in Human Milk

(Schlumpf et al., 2008 and in preparation)

Compound	Pilot Study+Study 1+Study 2		Pilot Study + Study 1	
N = 54	Women Reporting **Use %**	Detection in Human Milk **Samples %**	Women Reporting **Use %**	Detection in Human Milk **Samples %**
EHMC/OMC	66.0	77.8	58.8	64.7
Octocrylene	43.4	66.7	38.2	47.1
4-MBC	22.6	20.4	17.7	11.8
Bp-3	13.2	13.0	14.7	18.2
Homosalate	15.1	5.6	14.7	0
OD-PABA	1.9	1.9	2.9	2.9
Bp-2	18.9	0	0	0
3-BC	0	0	0	0
All UV Filters	77.4 %	85.2 %	76.4 %	80.95 %
Sunscreens	54.7 %		38.6 %	
Other Cosmetics	60.4 %		60.8 %	

GREEN Tox

Humanmilch : Chemikalien-Rückstände

NEUERE CHEMIKALIEN - Rückstände
Hormonaktive Substanzen
wie z.B. UV Filter
Konsum der Mütter (über Kosmetika) **77 %**
Vorkommen in Humanmilchproben **85 %**
Analyse von VKos zugelassen UV Filtern **8** von insgesamt 30 zugelassenen (= 22 %)
Davon Vorkommen in Humanmilch **6**

Weitere mögliche Quellen: in der Technik eingesetzte UV Filter:
UV Absorber (darunter sind auch die in der Kosmetik zugelassenen UV Filter) Total : **107**
(Nach: Int.Cosmetic Ingredient Dictionary and Handbook ,2004)
Vorkommen in: Stoffen; Kleidern, Teppichen, Vorhängen etc
In: Gegenständen, Plastik, Plastikfolien etc.

WAS TUN?
Deklaration lesbarer gestalten
Deklaration im INTERNET nicht vorhanden
Deklaration technisch verwendeter UV Filter diskutieren;

Empfehlung:
während Schwangerschaft und Stillen: Verwenden von Kosmetika ohne hormonaktive **UV Filter!**

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