Inneklimate och hälsa

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Dagsprogram

Vad vet vi om inneklimate och hälsa — egentligen?
Hur hanterar vi inneklimatem problem?
Är mögel så farligt som folk tror?

Praktiska fall / frågor / diskussion
www.orebroll.se/amm

Fjällglitmen stängs — drabbat av mögel

Mögelplaga i Gällivare

Sjuk-huset

Värdighet på Åsöld
Linjerna barnsjukhusa stängs efter allergikar

Ärlighet

Ingen sanering trots giftlarmet
Sjuka hyresgäster nekas sanering
Indoor Climate and Health –
What do we really know?

Kjell Andersson MD, MSc

The International Academy of Indoor Air Sciences. Deadly Household Pollution: A call for Action
Nature 447, 236-237 (17 May 2007) | doi:10.1038/447236a; Published online 16 May 2007

A lot of statistical associations have been published !!!

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Moisture/mould damaged environments – health effects …
Insufficient ventilation – symptoms …
Women report more symptoms than men do …
Those with allergic diseases report more symptoms from the mucous membrane and skin …

BUT
We do not usually
- know the agents of cause …
- know the mechanisms …
- understand why some people react the way they do

Low dose extrapolation

Log risk

Log dose

Sjögren T. 2007

Low dose extrapolation

Log risk

Log dose

Sjögren T. 2007
Case I

- TVOC<sub>mean</sub> 127 µg/m³
- NH₃ < 1 ppm in the indoor air
- Floor with casein-containing self-levelling screed
- Restoring cost 100 million US$
Mucosal Swelling (mm)

- Non-crusty teachers, n=31
- Crusty teachers, n=15

Provocation concentration

1 mg/ml 2 mg/ml 4 mg/ml

5 min. 10 min.

Chlimate chamber in Århus, Denmark

Normal dust
Aldehyde dust
Glucan dust Clean air

Change in pg/ml

100
0
-100
-200

Change in IL-8 after exposure

Kemiska ämnen ingen effekt (låga nivåer)
Damm inga klara effekter
Damm + kemiska ämnen visar effekter
Damm + Glukan visar effekter

Room temperature

too high

Varying room temperature

too low

Stuffy

"bad" air
Dry air
Unpleasant odor

Passive smoking

Noise

Light that is dim or causes glare and/or reflections

Dust and dirt

40% 80%

WORK ENVIRONMENT

(often bothered) %

Fatigue

Feeling heavy-headed

Headache

Nausea/dizziness

Difficulties concentrating

Itching, burning or irritation of the eyes

Irritated, stuffy or runny nose

Hoarse, dry throat

Dry or flushed facial skin

Scaling/itching scalp or ears

Hands dry, itching, red skin

Other

20% 40%

SYMPTOMS

(yes, often) %

Luktproblem

N.Trigeminus

N. Olfactorius

Amygdala

Cain W et al. Int Arch Occup Environ Health 2007;80:721-731
Experiences:
"As soon as I enter the building, my nose starts running"
Some people cannot go back to work despite successful restoration

WHY?

Factors     | Symptoms
---|---
smells     | negative     | →
mental pictures | negative   | →
 | positive, neutral | →
status     | worry, anxiety | →

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Fig. 1. Schema of the experimental set-up for an odor- CO2 inhalation paradigm.
The Museum of Modern Art in Stockholm

Case II

"sniffer dog findings"

Scared, stressed people
Strange allergy tests (75% pos SPT)
The personnel had not noticed this "allergy"

"Mold misery"

Costs: 65 million US$

Result:
Symptom reduction (within months)
Normalised allergy tests (SPT and RAST)
Frozen samples showed normal RAST-test, no positive mould test (2004)

Why this outcome in allergy tests?
Exposure??
Stress??
Mood?? (Zacharei B, Aarhus University)
Nervous system? Histamine sensitivity?

Body and brain are interacting !!!!

The main characteristics of the human brain

• extreme work distribution
• integrating associative cortex areas

Terje Lømo
Tim Bliss
LTP
Life has changed – but we still have the “same” body and brain

Basic criteria for survival
- Homeostasis
- Protection against enemies

Regulatory systems – hypothalamus etc.
- Immunological system
  - macrophages – first line defence
  - innate system
  - adaptive system – IgE, IgG etc.
- Psychoneurological mechanisms
  - “Stress” systems
    - HPA-axis (Hypothalmic-Pituitary-Adrenal)
    - sympathetic nervous system (adrenalin etc.)

Symptom perception

Final conclusions I

We know many associations between indoor exposures and health effects but a few causal relations between specific exposures and specific health effects, mainly because we do not know the mechanisms. It is necessary to have a holistic view and to realise that the body and brain interact. We need a more “real” multidisciplinary approach.

Experimental studies
- Objective measures
- Clinical studies (ind. susceptibility)
- Causing agents

WE NEED MORE ...

Increase of evaporation
- Ruptures
- Gland dysfunctions
- Epithelial alteration
- "Eye irritation"
- Faster cooling of cornea

- Temperature, high
- Relative humidity, 8:
- Trigeminal stimulation

- Reactive chemistry
- Pollutants
- Contact lens wearer
- Blinking anomalies
- Reduced blinking
- Slow lid movement
- Fatigue
- Fatigue

Other symptoms:
Despite our lack of "real" knowledge, most practical situations can be handled, using basic strategies and efficient risk communication and - by putting in financial resources

Risk communication
Information
Involvement
Respect