Repeating past mistakes: The banality and futility of nowadays cigarette smoke-related animal experimentation
Health hazards associated with cigarette smoke (CS)

Cigarette smoke:

- No. 1 cause of preventable deaths globally (6 Mio. deaths annually)
- A very wide array of chronic diseases and neoplasms
- The leading cause of lung cancer and chronic obstructive pulmonary disorder (COPD)
  - Demonstrated in humans by multiple epidemiological studies since 1930s
CS and animal experiments: A historical overview

Animal experiments since 1930s in multiple species:

- Inconclusive evidence for CS-associated lung cancirogenesis
  - mice: inflammation, tar-induced skin cancer, no lung cancer
  - > 1000 rats: lung cancer only in females
  - 4440 hamsters: larynx tumors, no lung cancer
  - Dogs, monkeys, rabbits: variable results

Hutt et al., 2005 – “the first example of a strong carcinogenic response in lungs of animals exposed to CS“

- No reliable animal models for studying CS effects except humans
- Vast public outcry against animal experiments

(Oden, 2018)
Nowadays CS animal experiments

(Hammer et al., 2018)
Nowadays CS animal experiments

Probiotic Prato cheese attenuates cigarette smoke-induced injuries in mice.

Vasconcelos FM¹, Silva HL², Poso SM², Barroso MV¹, Lanzetti M¹, Rocha RG³, Oraça JS⁴, Esmerino EA², Freitas MG², Silva MG⁵, Reices RG⁶, Grenato D⁷, Pimentel TC⁷, Santos AS⁸, Cruz AG⁹, Valença SS⁸.

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Nowadays CS animal experiments

**Developmental nicotine exposure affects larval brain size and the adult dopaminergic system of Drosophila melanogaster.**

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(Hammer et al., 2018)
Nowadays CS animal experiments

Curcumin prevents cigarette smoke extract induced cognitive impairment.

Muthuraman A¹, Thilagavathi L², Jabeen S², Ravishankar SB², Ahmed SS², George T², Rishitha N², Paramakrishnan N².

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Front Biosci (Elite Ed). 2019 Jan 1;11:109-120.

(Hammer et al., 2018)
Nowadays CS animal experiments

Diverse CS exposure systems:
- Whole body
- Nose only

Price > 100,000 €

- Genetically ‘predisposed’ GMOs
- ‘Assisted’ CS symptoms
- Alone the mouse background influences the CS effects (Enzmann et al., 2019)
Absurd animal experiments:
CS is bad in lung trauma and blood loss

Hartmann et al., 2018, University hospital of Ulm, Germany
Animals: C57BL/6J mice (11/53 died during the procedures)

CS exposure: 4-8 cigarettes / day
Blunt chest trauma: A blast to the chest
Hemorrhagic shock for 1 h: ca. 50 % blood vol., 30 % arterial pressure

Results: CS ↑ inflammation; CS + trauma ↑ mortality

Conclusion: Smoking negatively influences the outcome of lung trauma and blood loss in mice

Similar CS-trauma studies since at least 2011
Absurd animal experiments: 
CS is bad in lung trauma and blood loss

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Unnecessary, trivial findings
Absurd animal experiments:
Repetition and contradiction of clinical data

Bucher et al., 2017, Boehringer Ingelheim Pharma, Germany
Animals: BALB/c mice

CS exposure:
4 cigarettes/day; 4 days

Unnecessary, meaningless results for humans

Results:
CS + H1N1 – worst outcome
Abs – some protective function

However, the same target Abs previously failed in clinical trials

Conclusion: Abs not working in humans, reduce inflammation in mice
Absurd animal experiments: COPD in a highly artificial environment

Jia et al., 2018. Helmholtz Zentrum Munich, Germany
Animals: C57Bl/6J mice (different KOs)

CS exposure: 100 % CS
2 x 50 min/day; 5 days/week; 4-6 months

+ elastase-induced emphysema

Tracheostomy,
Lung functions

Killed,
Analysis

(Vergari et al., 2004)

Results: Specific genes and immunological reactions are dysregulated in mice and COPD patients

Why show it in mice, if shown in patients?
**In vitro and human-based systems**

Regulatory accepted *in vitro* methods
- Acute (inhalation) toxicity: NRU cytotoxicity assay
- Carcinogenicity: Bhas 42 cell and three cell transformation assays

3D airway cultures
- Normal
- Smoker
- Allergic Rhinitis
- Asthma
- COPD
- Cystic Fibrosis

Viable > 1 year

(epithelix.com)
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(Smoking-)Lung-on-a-chip models
- Multiple human models
  - Injury
  - Infalmmation
  - Pulmonary fibrosis
  - cancer
- Personalized solutions

(Yesil-Celiktas et al., 2018)
Is history repeating itself over and over?
Conclusions and outlook:
Humans are the only reliable model for CS effects

- Unnecessary, ineffective CS-related animal experiments are still performed
- A regulatory ban is needed for such experiments
- CS research: a focus on prevention and human-based methods
Doctors Against Animal Experiments Germany (DAAE)

Charitable organization founded in 1979

~3000 members, 1/3 are doctors & scientists working in the medical field

Provides scientific information against animal experiments for scientists and the public

Organizes campaigns, actions, lectures, congresses etc.

The Herbert Stiller Research Grant for outstanding animal-free, human-based scientific projects

Congress “Science Instead of Animal Experiments”
Cologne, 27th Oct. 2018
www.wist-kongress.de/

Abolition of all animal experiments for ethical and scientific reasons

Increased support of animal-free research

Increased support of disease prevention
Thank you for the attention!

Animal experiments seriously harm you and others around you.


http://www.epithelix.com/


Scireq, https://www.scireq.com/2016/05/19/inexpose-featured-in-recent-nature/, , accessed on 02. 01. 2020

