ARISTOTLE UNIVERSITY OF THESSALONIKI

iGEM Thessaloniki



Undergraduate , interdisciplinary synthetic biology team of Aristotle University of Thessaloniki

Annual participation at the inthernational iGEM synthetic biology competition amongst students from famous universities → Peak competition for biology and entrepeunership

Contains : brainstorming,experimental design, bussiness pathway analysis, impact analysis and social activities

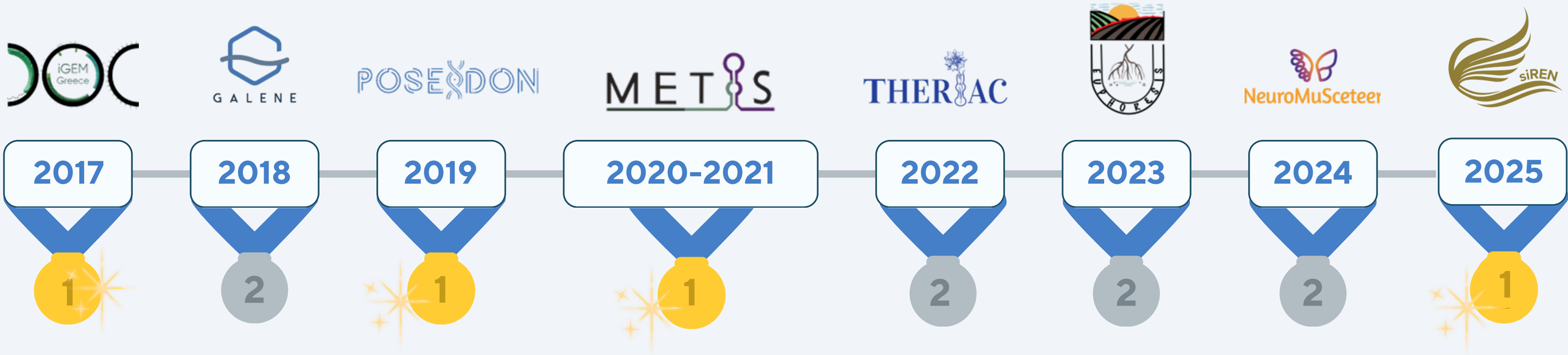


The goal: Solving a worldwide problem through synthetic biology

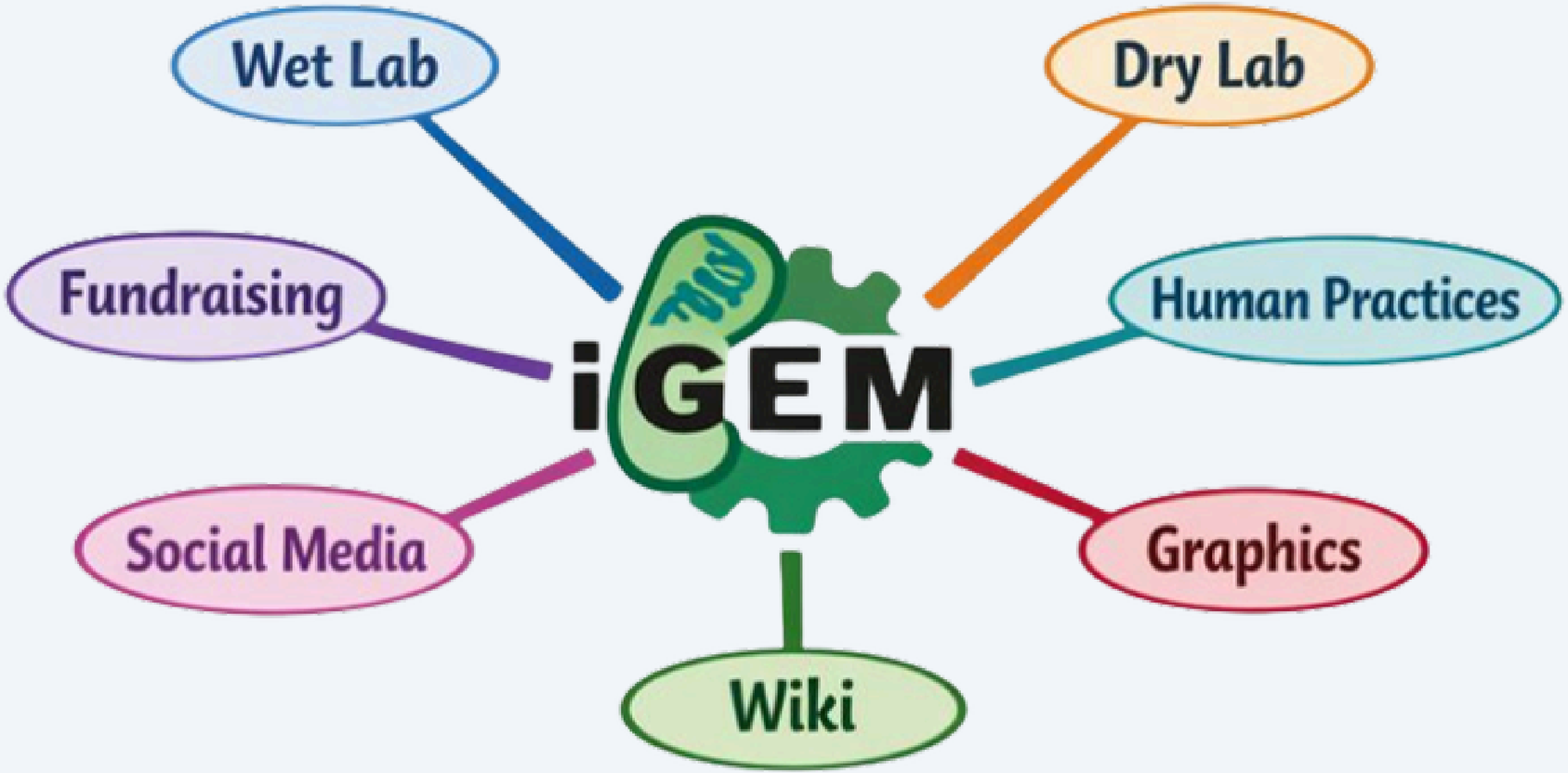
Under the order of AUTh

The first iGEM team established in Greece in 2017

The history of iGEM Thessaloniki



Team organization



Our current team

(Principal Investigator): Biochemistry proffesor Dr. Michalis Aivaliotis (Biological Chemistry Lab, Faculty of Medicine AUTh) and coordinator of the research team of Functional Proteomics and Systematics Biology at Center for Interdisciplinary Research and Innovation (CIRI) / CIRI AUTh

LinkTree



Qualitative literature research on the lung cancer development risk at firefighters





Introduction

01 Compounds in fire smoke

02 Comparative research on lung cancer at firefighters

03 Removal of filter during autopsy

Compound categories

International Agency for Research on Cancer		
Known carcinogenic to humans	probable carcinogenic to humans	possible carcinogenic to humans
benzo(*a*)pyrene	dibenzo(*a*,*l*)pyrene	naphthalene
nickel	dibenz(*a*,*h*)anthracene	chrysene
arsenic	cobalt	anthracene
cadmium	trivalent antimony	dibenzo(*a*,*i*)pyrene

International Agency for Research on Cancer

01 Aromatic cyclic carbonhydrates

02 CO2 CO

03 Particles with diameter <2,5μm <4μm (αμίαντος)

WAYS OF EXPOSAL TO BREATHABLE MATTER



CO intoxification

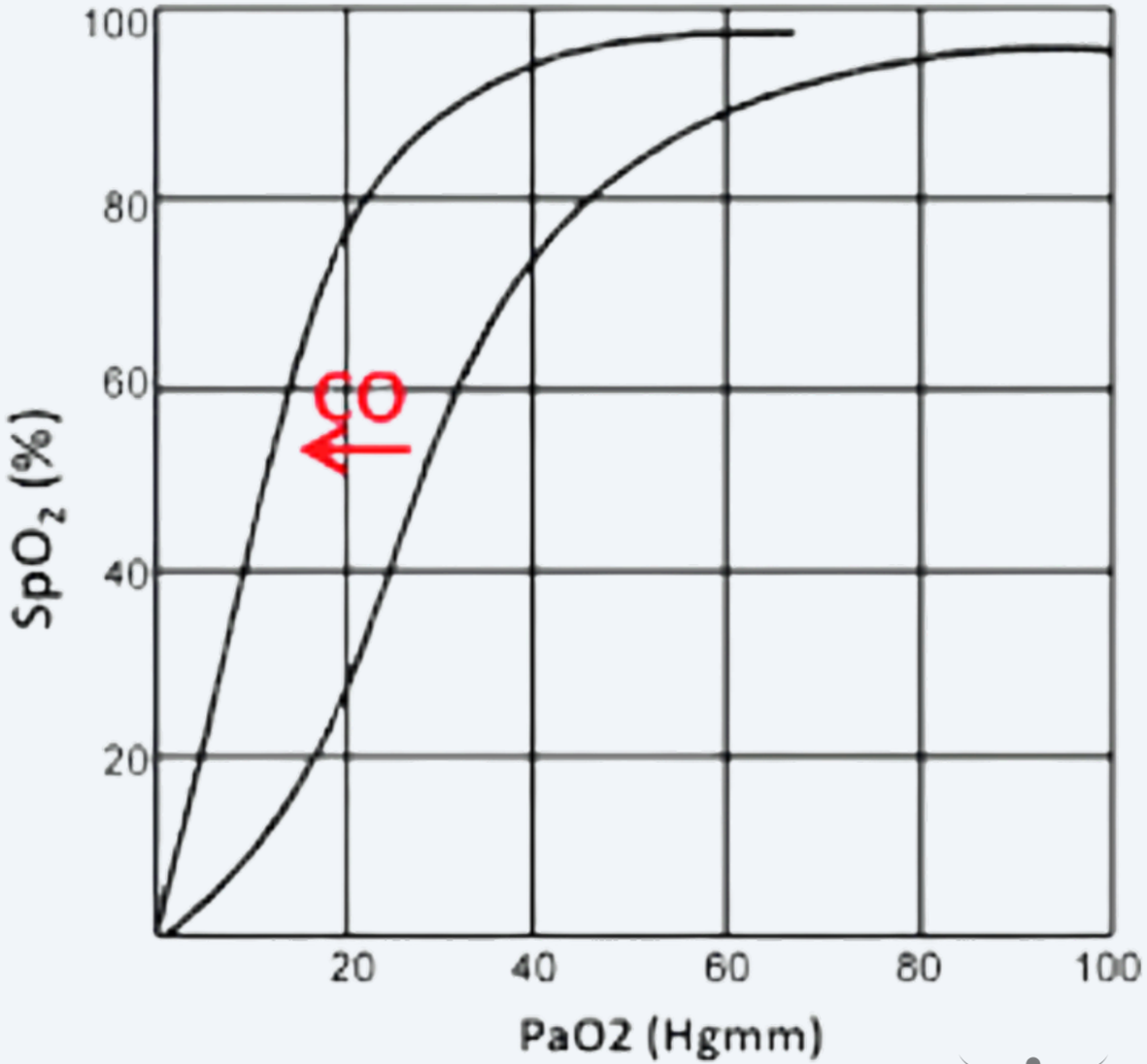
Tissues→ oxygen

Blood→Hemoglobin

Hb + O2→ HbO2 ΔG=-70

Hb + CO → HbCO ΔG= -90

YOU CANNOT REALISE IT



Small contex research



SAMPLE BEFORE



FIREFIGHTING





Contents lists available at ScienceDirect

Science of the Total Environment

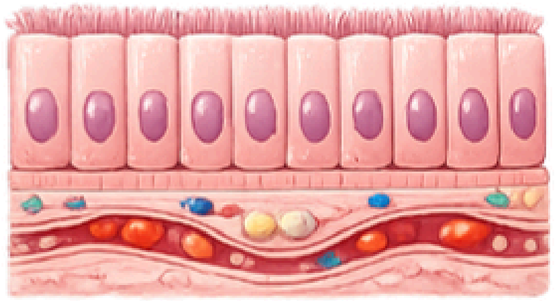
journal homepage: www.elsevier.com/locate/scitotenv

Impact of wildfire emissions exposure on the associations between levels of lung injury, lipid peroxidation, DNA oxidation, and exposure biomarkers

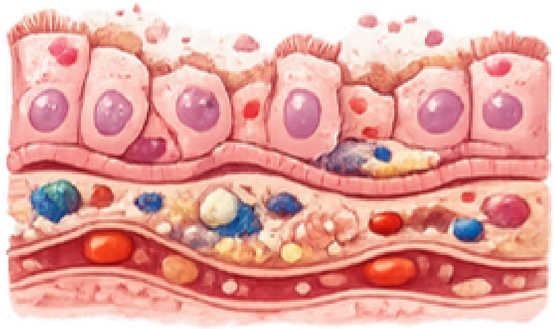
Bela Barros [a], Ana Margarida Paiva [a], Rui Azevedo [b], Sara Alves [c], Filipa Esteves [d,e,f], Adília Fernandes [c], Josiana Vaz [g,h], Maria José Alves [g,i], Klara Slezakova [j], João Paulo Teixeira [d,e], Solange Costa [d,e], Agostinho Almeida [b], Marta Oliveira [a], Simone Morais [a,*]

DAMAGE TO DNA AND CELLS

Normal Lung Epithelium



Damaged Lung Epithelium



Normal DNA

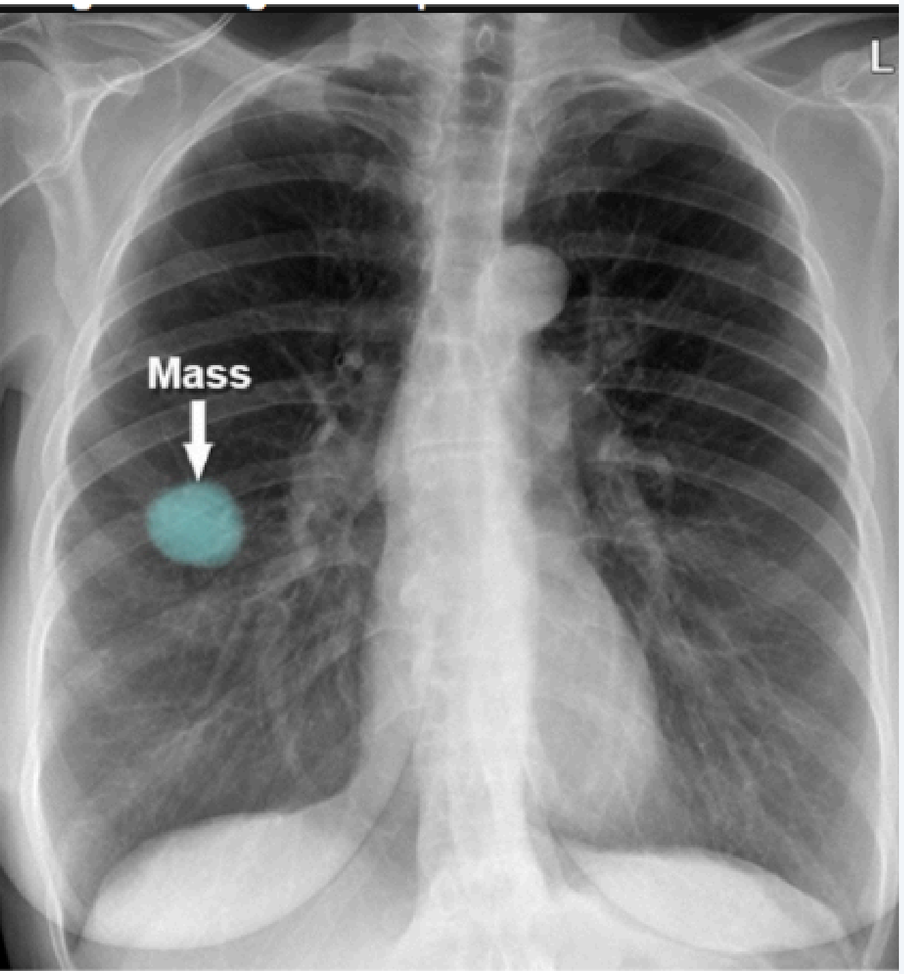


Damaged DNA









SMALL CONTEX RESEARCH

- Screening at fire brigades in Chicago
- Computational tomography and RAD criteria

Lung (2024) 202:649–655
https://doi.org/10.1007/s00408-024-00736-9

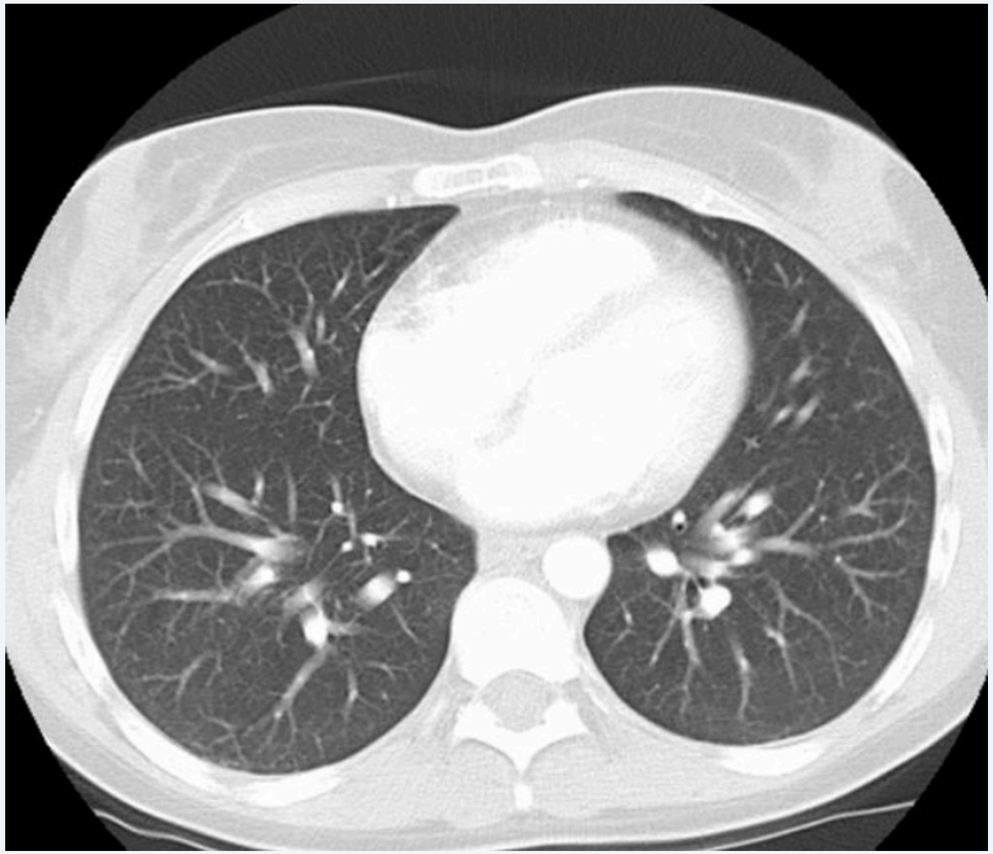
RESEARCH

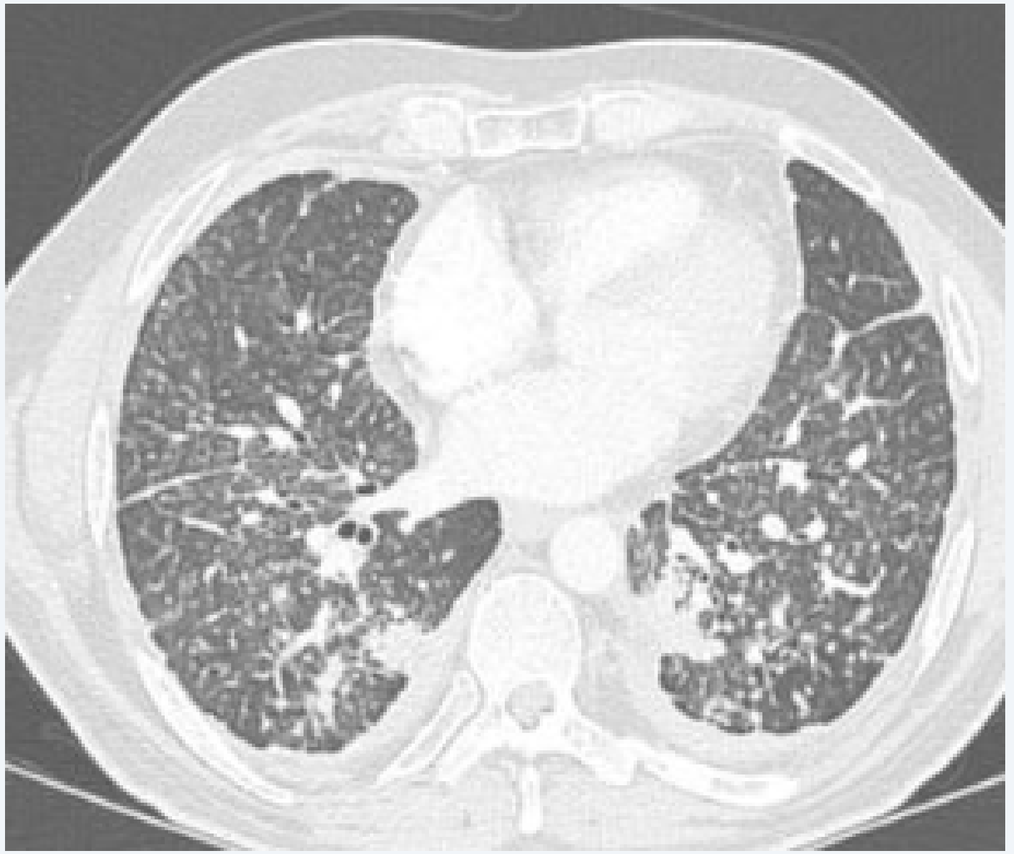
LUNG CANCER SCREENING IN FIREFIGHTERS

Examination of Firefighting as an Occupational Exposure Criteria for Lung Cancer Screening

Savan K. Shah[1] · Seungjun Kim[1] · Arsalan A. Khan[1] · Vaishnavi Krishnan[1] · Ann M. Lally[1] · Palmi N. Shah[2] · Gillian C. Alex[1] · Christopher W. Seder[1] · Michael J. Liptay[1] · Nicole M. Geissen[1]

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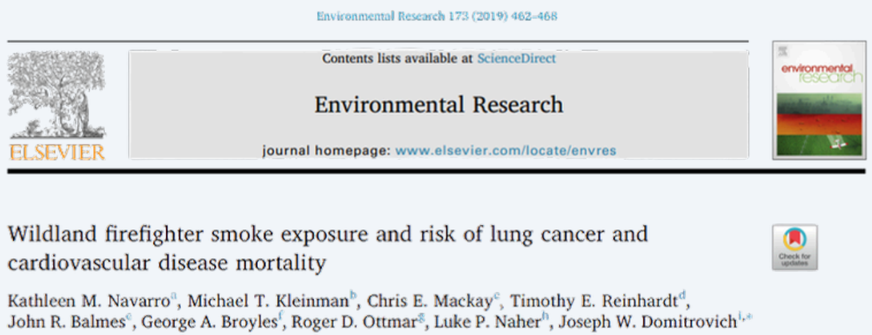
LYMPHNODES

Lond scale research

- There is an iformation gap at long scale research
- Long development period
- Any results are unpredictable

RISK ASSESMENT

- **Fire smoke is similiar to tobaco smoke**
- **Pope III et al. (2011) → relation of exposure to response**
- **Particles <4µm**
- **RR = 1 + 0.3195 (dose)^0.7433**
- **Risk assesment at firefighters**


Environmental Research 173 (2019) 462–468

Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres

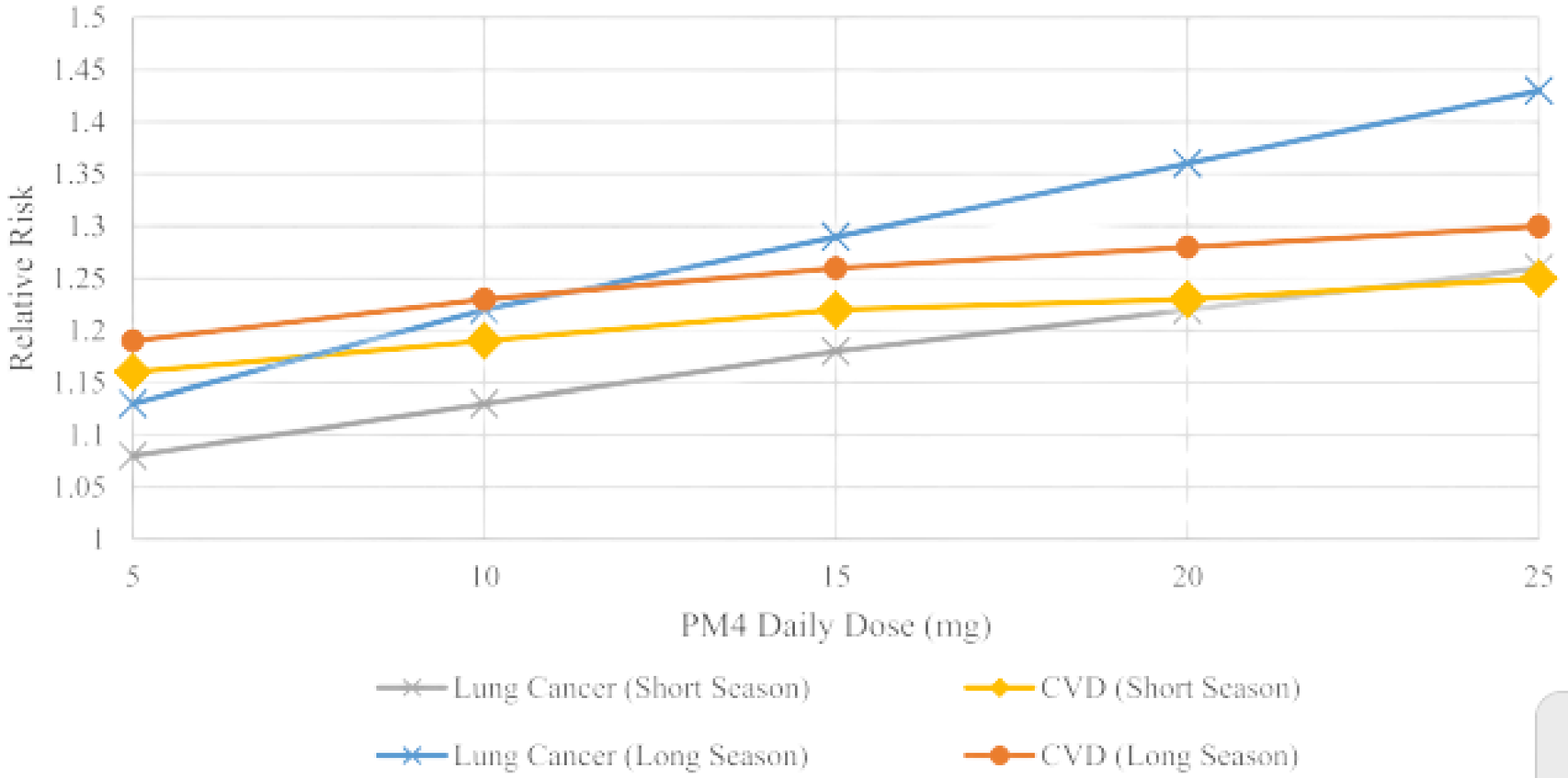
Wildland firefighter smoke exposure and risk of lung cancer and cardiovascular disease mortality

Kathleen M. Navarro[a], Michael T. Kleinman[b], Chris E. Mackay[c], Timothy E. Reinhardt[d], John R. Balmes[e], George A. Broyles[f], Roger D. Ottmar[g], Luke P. Naher[h], Joseph W. Domitrovich[i,*]

RISK ASSESMENT

Contribution of:

- Hours of service
- Hours of battle
- respiratory frequence
- days and years of smoke on body





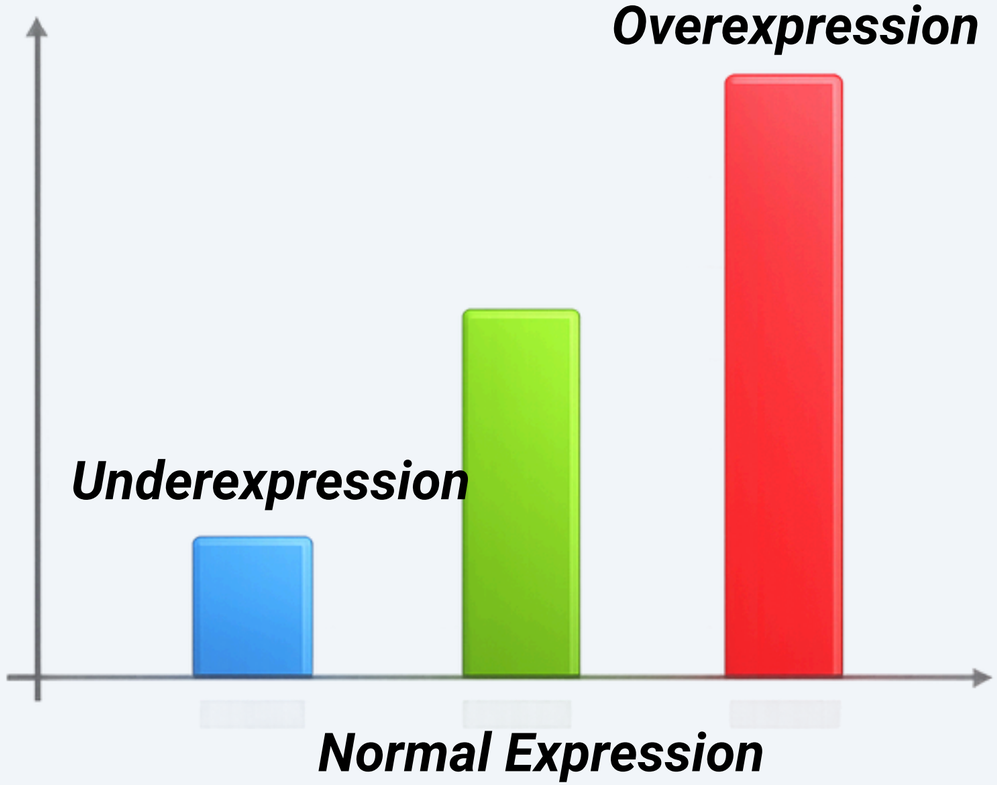
SHOULD WE REMOVE THE BREATHING FILTER ON AUTOPSY?

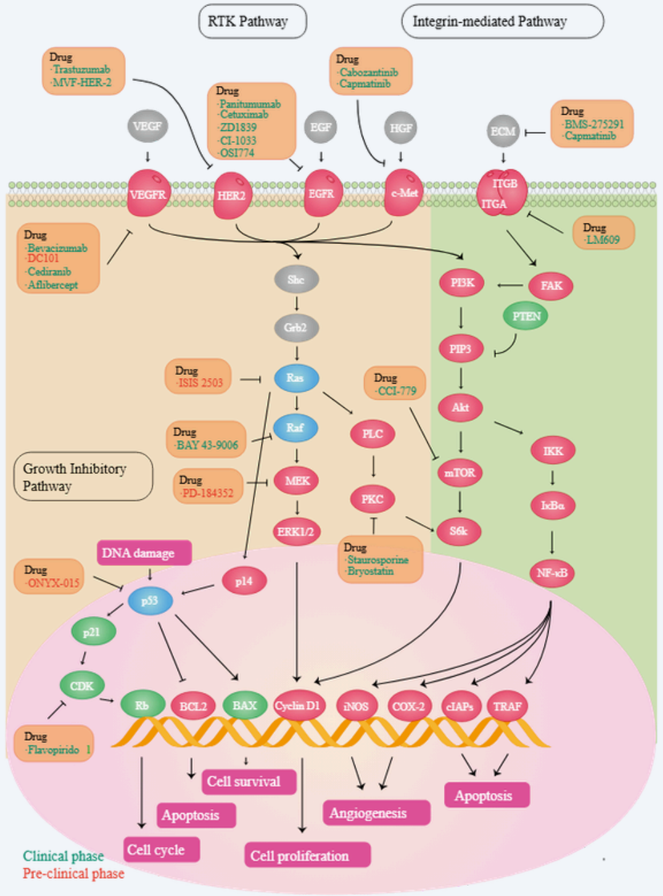
PLOS ONE

RESEARCH ARTICLE

Exposure to a firefighting overhaul environment without respiratory protection increases immune dysregulation and lung disease risk

Stephen J. Gainey[1], Gavin P. Horn[2], Albert E. Towers[3], Maci L. Oelschlager[4], Vincent L. Tir[4], Jenny Drnevich[5], Kenneth W. Fent[6], Stephen Kerber[7], Denise L. Smith[2,8], Gregory G. Freund[1,3,4]*





SHOULD WE REMOVE THE BREATHING FILTER ON AUTOPSY?

CONCLUSION

01 Risk is confirmed with small contex research

02 Lack of long scale studies

03 Importance of screening

04 Risk assesment through mathematic models

05 Use of protective gear and filters during autopsy

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THANK YOU FOR YOUR TIME!

iGEM Thessaloniki

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