

# Sao Paulo School of Advanced Science on Mass Spectrometry-based Proteomics SPSAS-MS

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## SECOND-HAND SMOKE EXPOSURE EFFECTS ON NASAL EPITHELIA PROTEOME

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### Background and Objectives

Environmental secondhand smoke exposure (SHS) results in a statistically significant increase in the risk of diseases such cardiovascular diseases and lung cancer. Cigarette smoke contains thousands of constituents, including several carcinogens and cytotoxic chemicals that orchestrate chronic inflammatory responses and destructive remodeling events<sup>1,2</sup>. In this work, our main objective is to uncover biomarkers of SHS exposure effects by investigating the proteome of nasal epithelia from health subjects occupationally long-term exposed to SHS.

### Materials and Methods

### Results

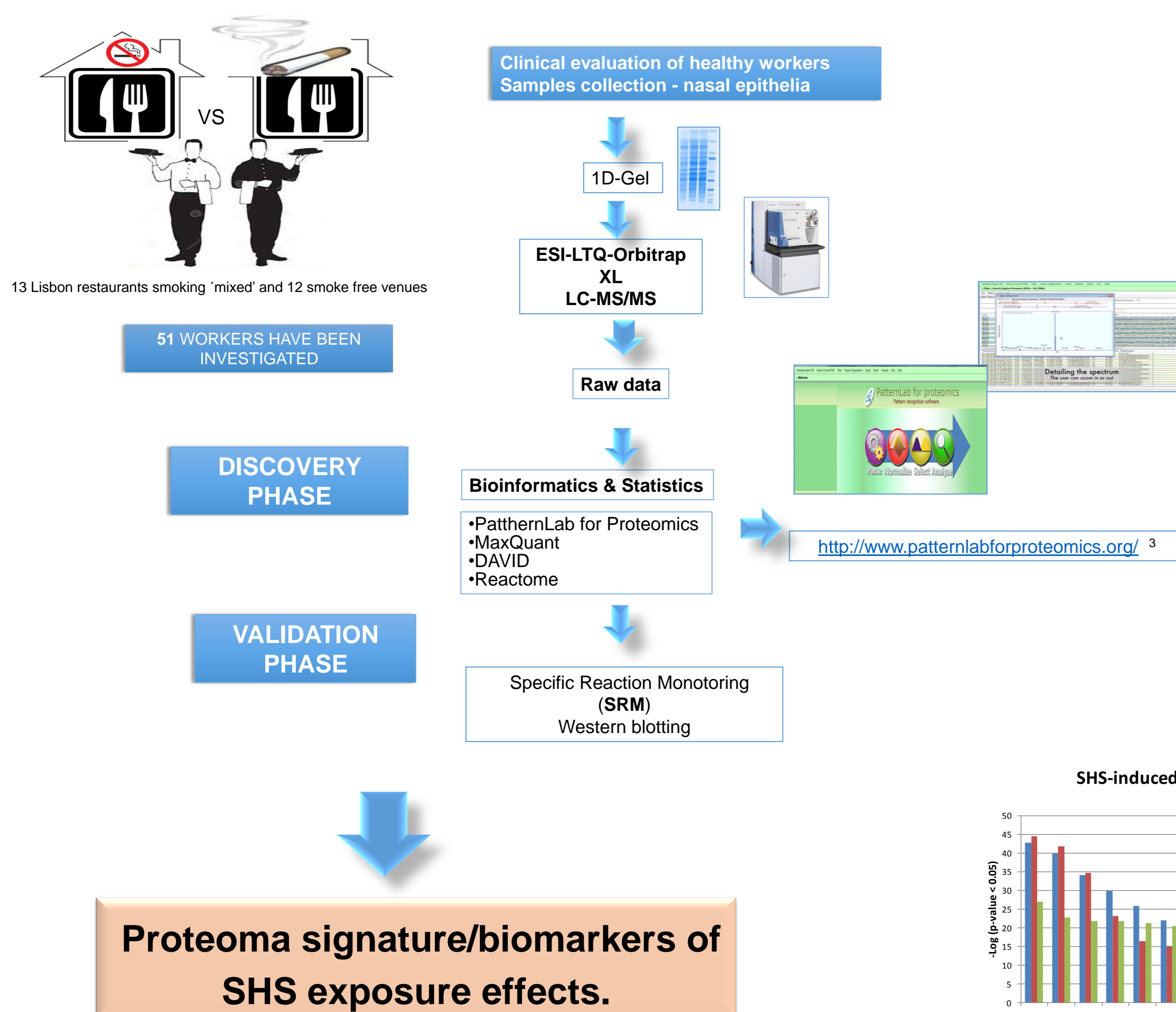
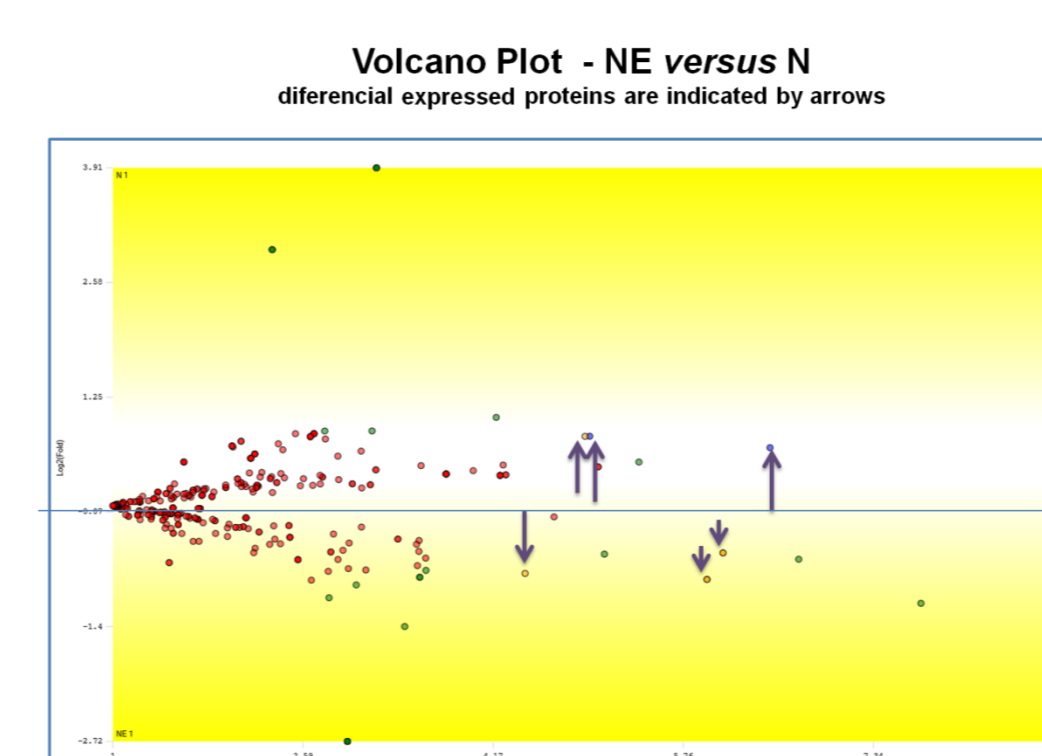


Table 1. Demographics of the study population

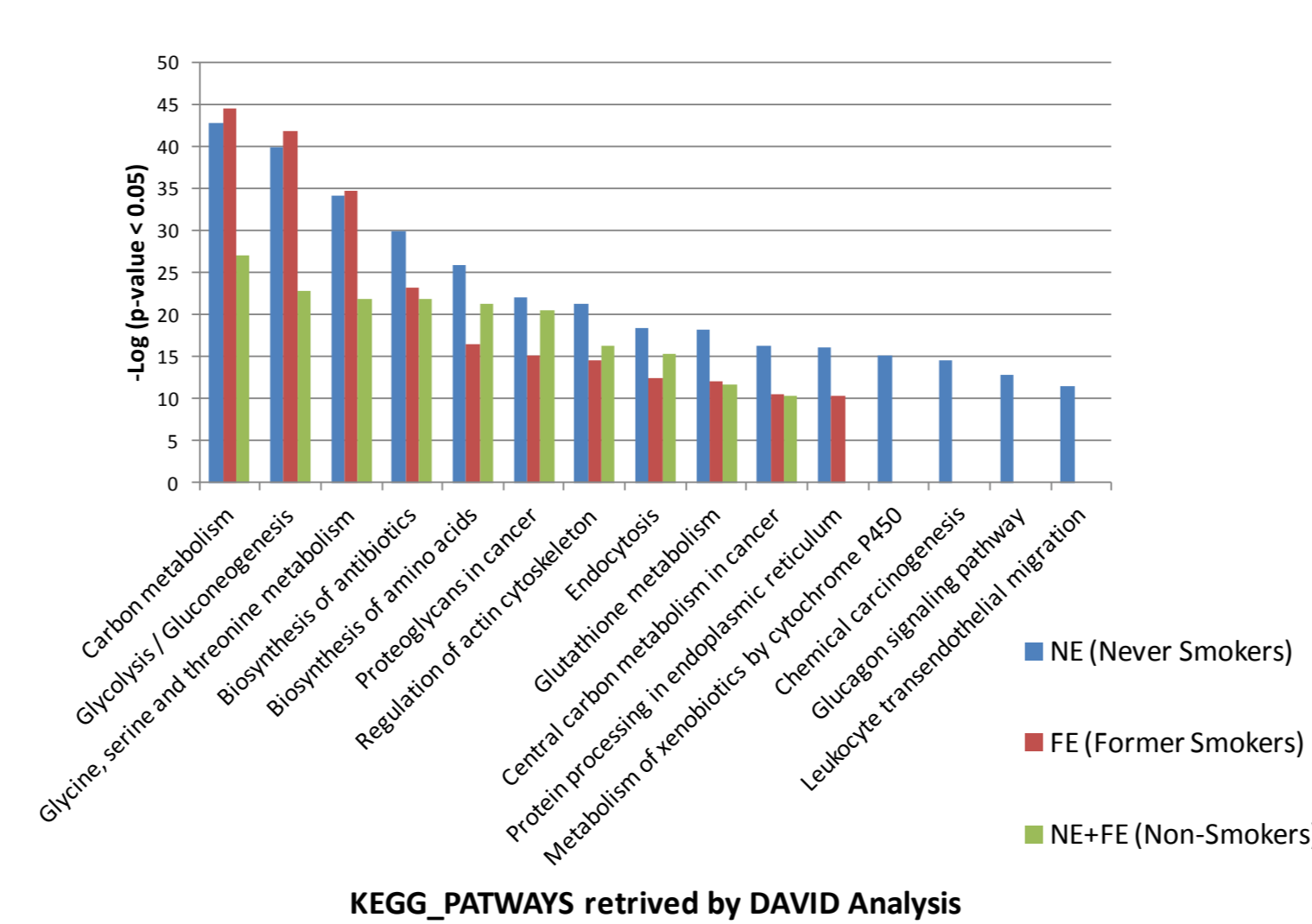
Parameters	N	F	S	NE	FE	SE	p-value
Subjects (N)	30	8	8	11	10	4	
Age (yr)	47.7±5.5	48.0±13.5	45.2±8.6	32.7±7.4	38.8±11.1	35.1±2.9	p<0.05 (ANOVA)
Gender (F/M)	4/6	3/5	3/5	1/10	2/8	3/7	p=0.05 (ANOVA)
Time in the workplace (years)	17.4±12.5	21.1±1.9	6.4±5.2	3.8±2.3	8.0±11.8	5.9±3.5	p=0.02 (T-test)
Worktime (hours/week)	42.2±11.3	52.0±4.8	42.2±9.4	37.1±9.1	36.4±8.5	52.5±2.5	p=0.02 (T-test)
Tobacco smoking parameters							
Tobacco smoking (years)	n.a.	12.9±10.8	30.3±9.7	n.a.	6.5±6.6	17.5±4.8	p<0.05 (T-test)   p<0.05 (SvSE)
Tobacco smoking (cigarettes/day)	n.a.	7.8±5.8	15.1±7.7	n.a.	15.5±27.7	19.8±3.3	p<0.05 (T-test)   p<0.05 (SvSE)
Quit of tobacco smoking (years)	n.a.	13.7±8.1	n.a.	n.a.	36.3±11.9	n.a.	p<0.05 (T-test)
Pulmonary function parameters							
FVC	48.1±7.2	96.5±10.7	104.4±20.5	92.8±7.4	96.0±14.1	85.8±6.0	p<0.05 (ANOVA)
FEV <sub>1</sub>	89.6±8.6	96.6±13.6	99.8±18.4	98.4±9.0	95.7±15.9	90.3±10.2	p<0.05 (ANOVA)
FEV <sub>1</sub> /FVC (BEST)	80.0±3.1	87.7±6.2	76.5±4.6	87.2±5.4	79.9±7.5	85±5	p<0.05 (ANOVA)
Urine cotinine (ng/ml)	5.3±0.46	5.7±1.9	1367.7±602.2	11.0±7.3	5.9±1.0	1873.2±498.7	p<0.01 (T-test)
							Non-Smokers (Exposed vs non-Exposed) X 8.5vX 5.5 (ng/ml)

Abbreviation: N - Never smokers; F - Former smokers; S - Smokers; NE - Never smokers Exposed to Second Hand Smoking (SHS); FE - Former smokers Exposed to SHS; SE - Smokers Exposed to SHS; FVC - forced volume vital capacity (the determination of the vital capacity from a maximally forced expiratory effort); FEV<sub>1</sub> - volume that has been exhaled at the end of the first second of forced expiration; FEV<sub>1</sub>/FVC is the ratio between FEV<sub>1</sub> and FVC; n.a. - not applicable.

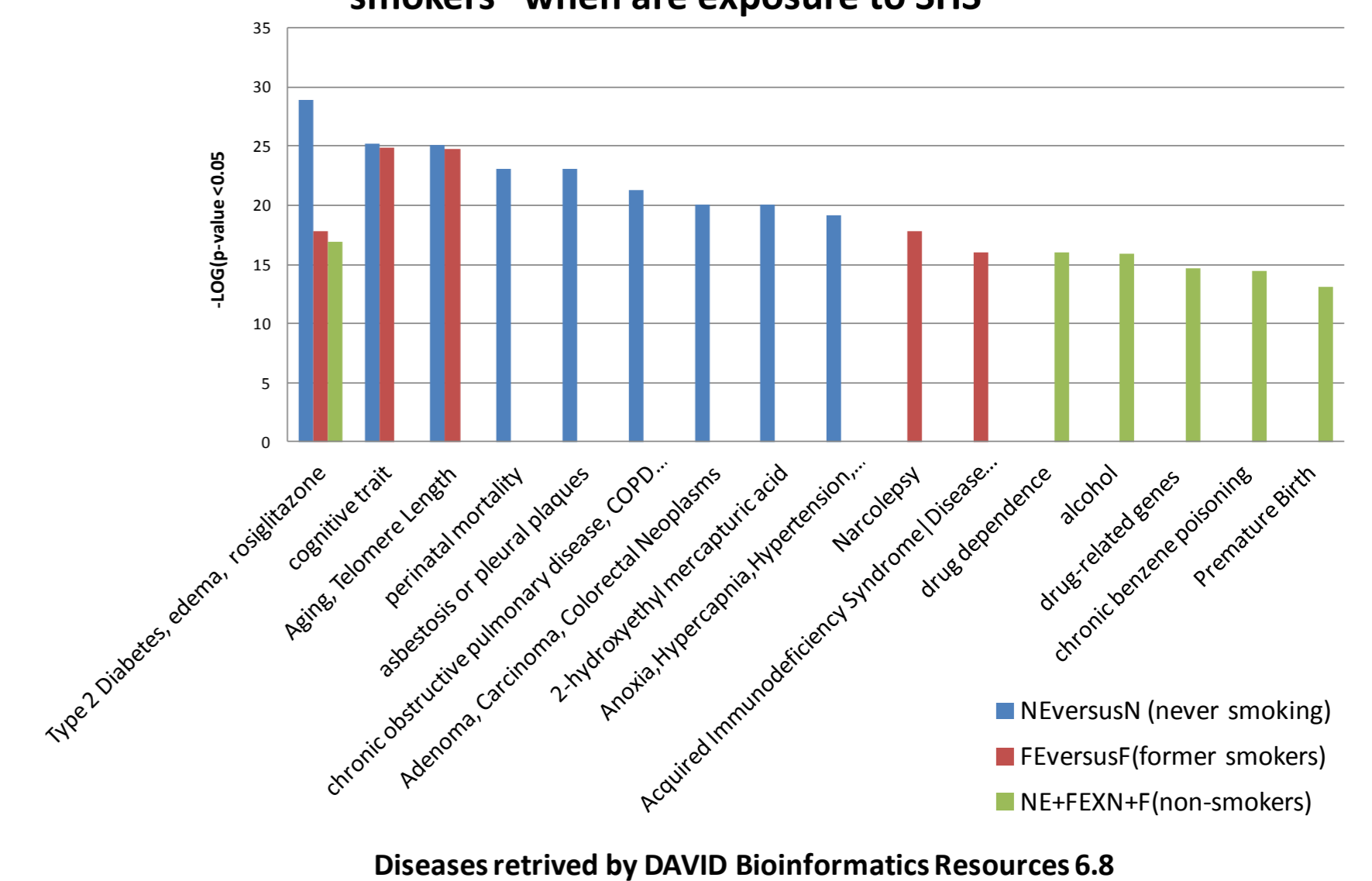


P05141	ADP/ATP translocase 2 OS=Homo sapiens GN=SLC25A5 PE=1 SV=7
H3B031	60S ribosomal protein L4 (Fragment) OS=Homo sapiens GN=RPL4 PE=1 SV=1
FSH514	L-lactate dehydrogenase A chain OS=Homo sapiens GN=LDHA PE=1 SV=1; F5GZQ4 L-lactate dehydrogenase A chain (Fragment) OS=Homo sapiens GN=LDHA PE=1 SV=1
FSH6W8	L-lactate dehydrogenase A chain OS=Homo sapiens GN=LDHA PE=1 SV=1
P19013	Keratin, type II cytoskeletal 4 OS=Homo sapiens GN=KRT4 PE=1 SV=4
P36578	60S ribosomal protein L4 OS=Homo sapiens GN=RPL4 PE=1 SV=5; H3BM89 60S ribosomal protein L4 OS=Homo sapiens GN=RPL4 PE=1 SV=1
P98088	Mucin-5AC OS=Homo sapiens GN=MUC5AC PE=1 SV=4

### SHS-induced PATHWAYS IN NASAL EPITHELIA



### Diseases associated with "never", "former" and "non-smokers" when are exposure to SHS



### Conclusions

Prolonged occupational exposure to SHS modulates nasal epithelia proteome associated with pathways and diseases recognized as induced by tobacco smoking<sup>4</sup>. Further validation studies are needed to the better understanding the SHS exposure-induced mechanisms as risk factors for airway diseases.

### Acknowledgements:

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References: 1-Hori M et al., 2016. Jpn J Clin Oncol. Oct;46(10):942-951. 2-I Lewis JB et al., 2017. Int J Mol Sci. Mar 17;18(3). 3- Carvalho PC, 2016. Nat Protoc. Jan;11(1):102-17. 4-de Jong K et al., 2017. Respir Res. Jul 24;18(1):142.

