



# Identification of biomarkers in nasal lavage fluid from individuals with work-related upper airway symptoms associated to moldy and damp buildings

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Demographic data	Workplace A	Workplace B	Controls
<b>Subjects (total)</b>	14	15	13
- <b>Females</b>	11	14	11
- <b>Males</b>	3	1	2
<b>Age (mean ± SD)</b>	52 ± 10	50 ± 9	48 ± 13
<b>Diagnosed asthma</b>	0	1	0
<b>Allergy positive (ImmunoCap®)</b>	3	1	0
<b>Smokers</b>	3	1	0
<b>Living in a damp or moldy building</b>	0	0	0

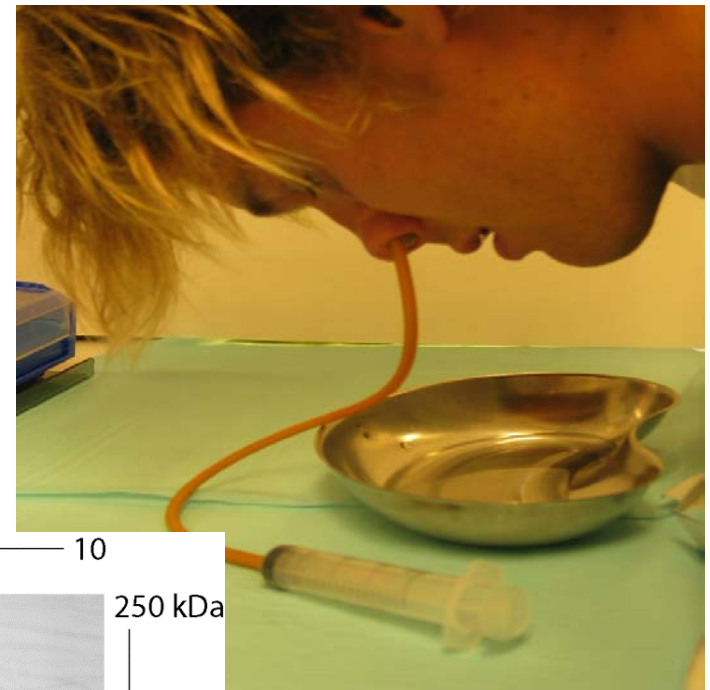
Daily perceived symptoms	Workplace A	Workplace B	Controls
<b>Upper airway symptoms</b>	(%)	(%)	(%)
<b>Irritated, stuffy or runny nose</b>	71	40	8
<b>Nasal bleeding</b>	14	0	0
<b>Hoarse, dry throat</b>	71	13	0
<b>Cough</b>	50	7	0
<b>Other symptoms</b>			
<b>Skin problems; dry, itching, red skin</b>	50	13	8
<b>Heavy breathing/wheezing<sup>1</sup></b>	14	7	0
<b>Itching, burning, or irritation of the eyes</b>	50	40	0



- Low levels of total amount of VOCs were found in workplace A
- In workplace B a little higher levels of n-butanol (900-1100  $\mu\text{g}/\text{m}^3$ ), 2-ethylhexanol (150-250  $\mu\text{g}/\text{m}^3$ ) and alpha-pinene (100-150  $\mu\text{g}/\text{m}^3$ ) were detected
- A distinct odor of mold and the presence of mold spores were found in all building material samples from workplace A but not in workplace B

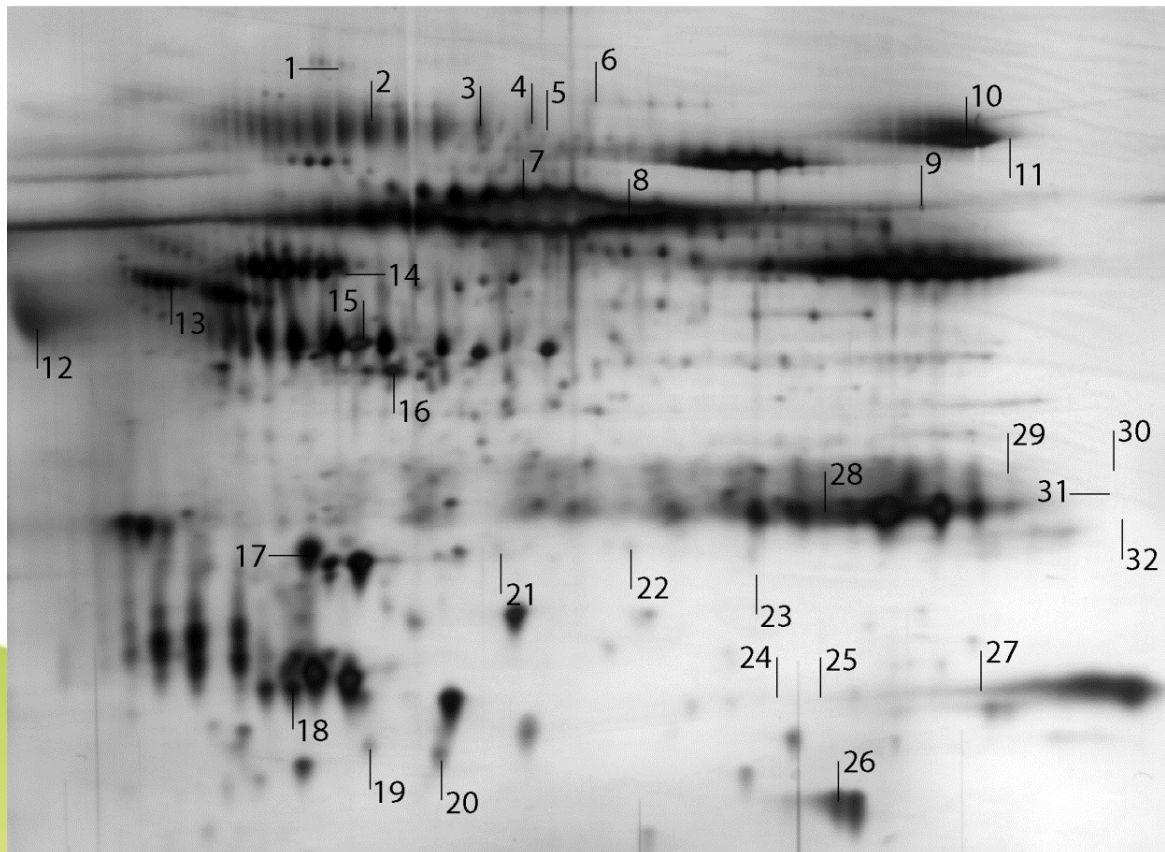


- Building A: was most likely water damage that caused microbial growth and decomposition of organic building materials, especially around the windows.
- Building B: the main problem was a faulty mixture of the glue below the linoleum floor, which led to degradation of the glue and emission of VOCs (mainly n-butanol and 2-ethylhexanol).



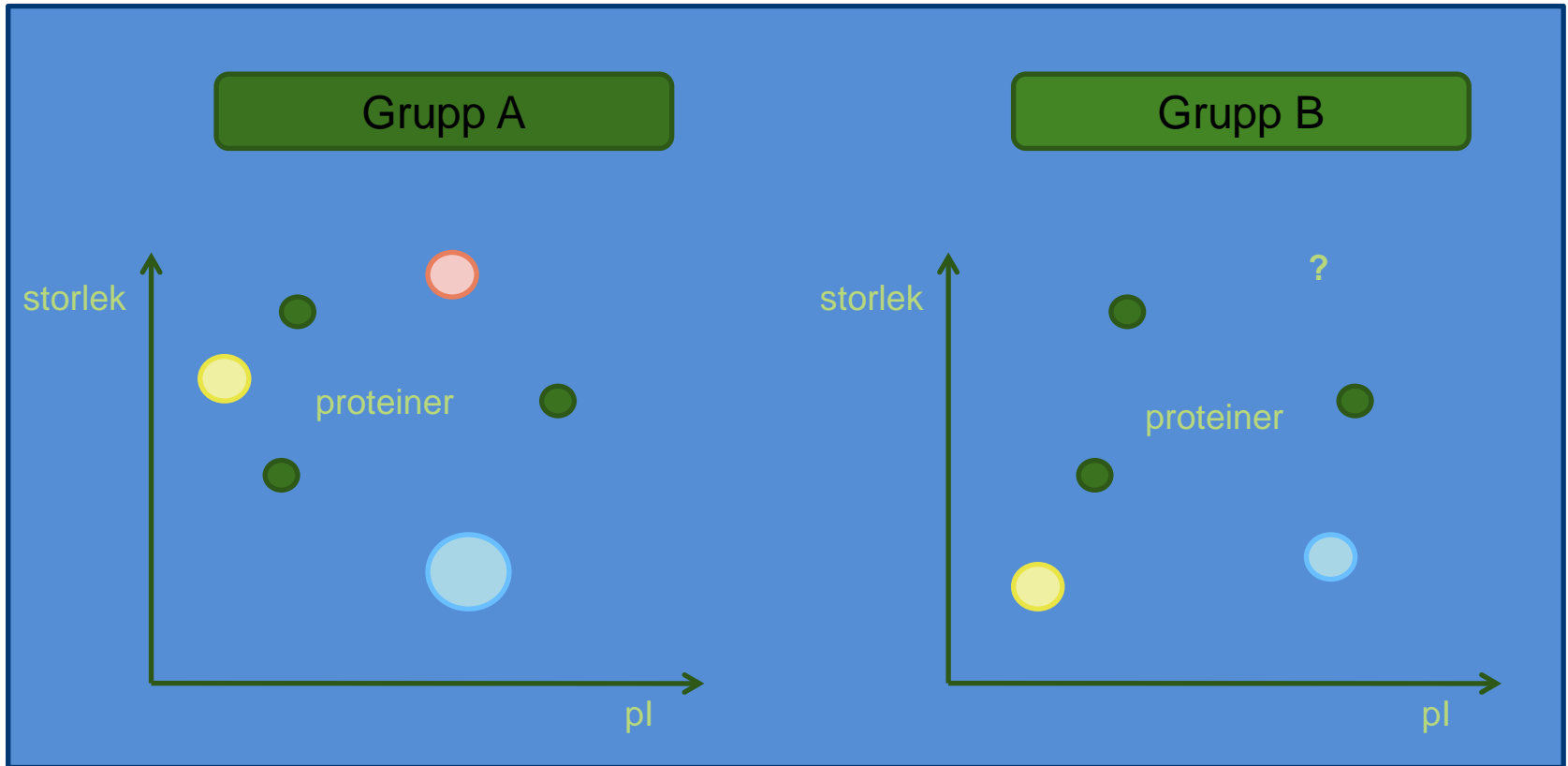
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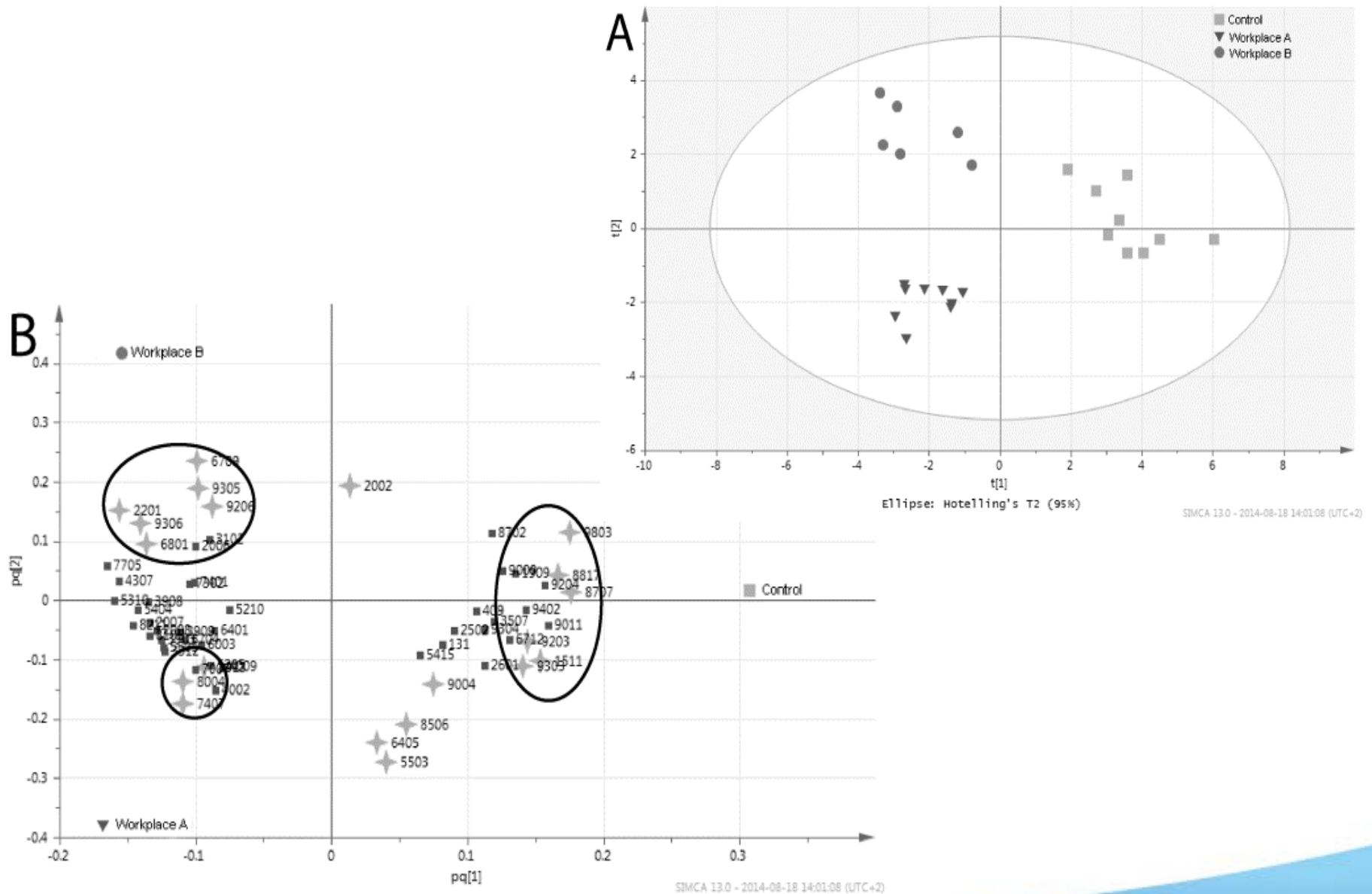


250 kDa

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No.	Protein name	CoeffCS		
		Workplace A	Workplace B	Control
	Control			
<b>8817</b>	Lactotransferrin	-0.11	0.04	0.07
<b>9803</b>	Lactotransferrin	-0.13	0.05	0.08
<b>9303</b>	Ig kappa chain C region	0.02	-0.08	0.05
<b>1511</b>	Alpha-2-HS-glycoprotein	0.01	-0.07	0.05
<b>8707</b>	Serum Albumin	-0.11	0.01	0.10
	Workplace A			
<b>8004</b>	Protein S100-A8	0.07	-0.04	-0.04
	Workplace B			
<b>6801</b>	Complement factor B	-0.10	0.11	0.00
<b>9206</b>	Lipocalin-2	-0.09	0.09	0.00
<b>9305</b>	Lysozyme C	-0.15	0.13	0.03
<b>9306</b>	Lysozyme C	-0.05	0.08	-0.02
<b>6709</b>	Serum albumin	-0.08	0.13	-0.03



# Conclusion

- The health questionnaire concerning daily perceived symptoms showed that a majority of the exposed subjects reported daily upper airway symptoms.
- In both workplaces some volatile organic compounds that can be coupled with degradation of building material where found.
- In one of the workplaces a distinct odor was noted and mold spores were found.



- This approach might be a useful method for identifying possible biomarkers in smaller study population but with a large number of data for each individual, making it possible to investigate the significance of several hundreds of proteins in in the same model.



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