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Influence of psychosocial stress on salivary metabonomic profile

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Background

- ✓ Human mistake: first plane accident cause
- ✓ 19 fatal accidents in 2016 aiming to 325 deaths

datas from Flight Safety Foundation, 2016

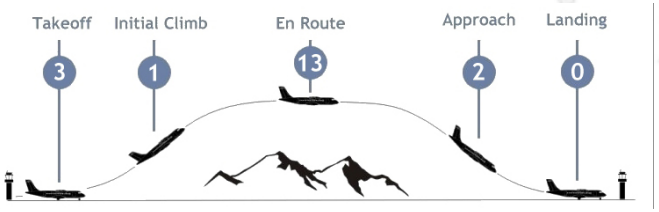
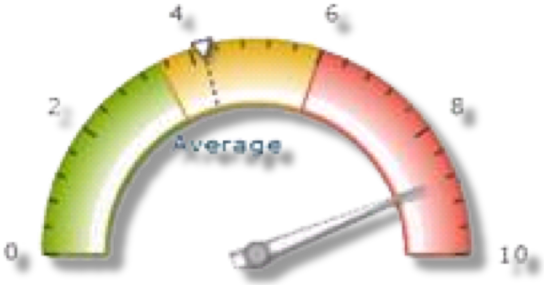


Fig. 1 : Plane accidents in commercial aviation in 2016

Biovoc project

Main goal of Biovoc project :



Pilot's voice is recorded → Voice analyzer → Stress and fatigue level warning

Strategy

- Demonstrate a correlation between speech signal changes and physiological data of stress, mental fatigue and work load

- Which data are assessed ?

  - Salivary Biomarkers level : MHPG, cortisol, DHEA
  - Saliva ^{1}H-NMR Metabonomic profiling

Methods

LC-ECD/FLR/MS

Biomarker quantification

Targeted

Non-targeted

^{1}H-NMR

Metabonomic profiling

Emotional States

Metabonomic profiling

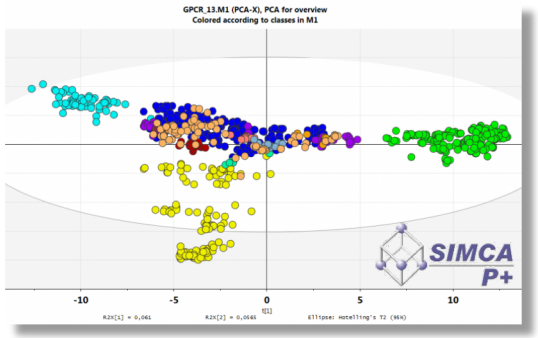
Metabonomic profiling

Protocole

1- Microcentrifuge filtrated saliva

2- ^{1}H-NMR spectroscopy (Bruker 500)

3- Multivariate analysis on SimcaP+



Metabonomic profiling

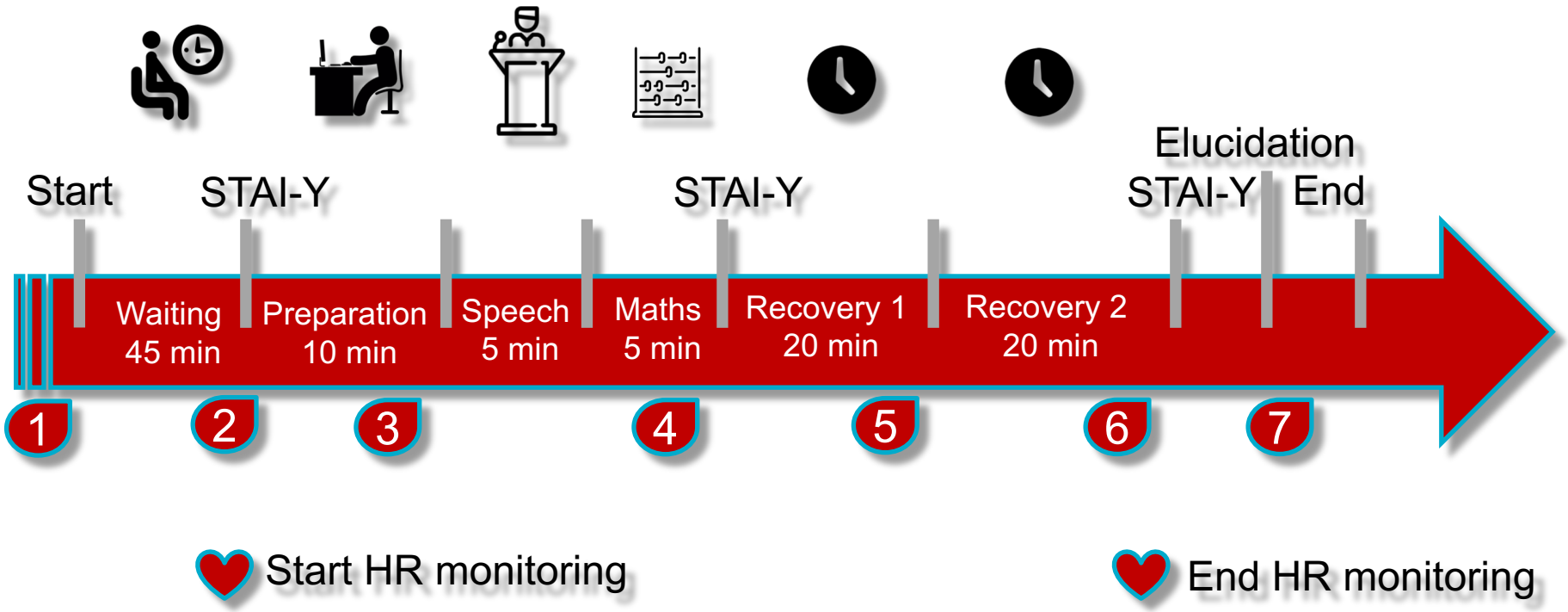
Challenge :

Does stress induce changes on salivary metabonomic profile ?

➔ Assessment of this assertion with **Trier social stress test (TSST)**

Metabonomic profiling

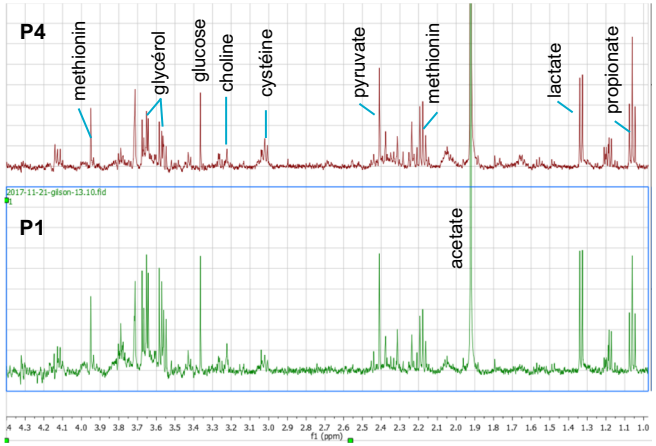
On going study : Trier Social Stress Test

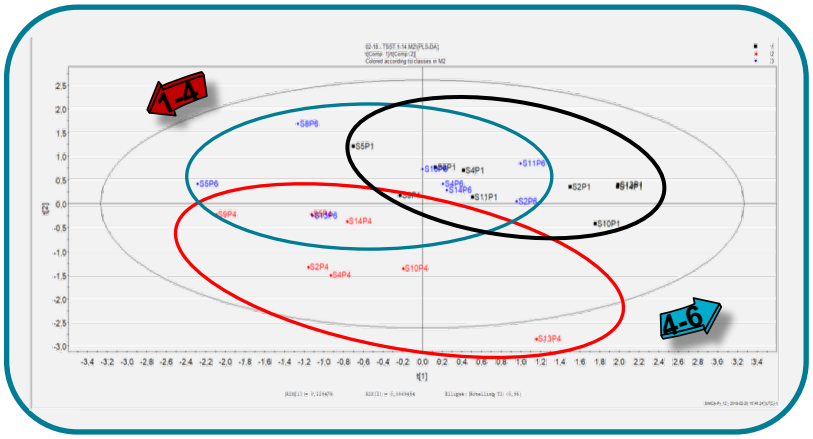


TSST Study

17 subjects

3 controls



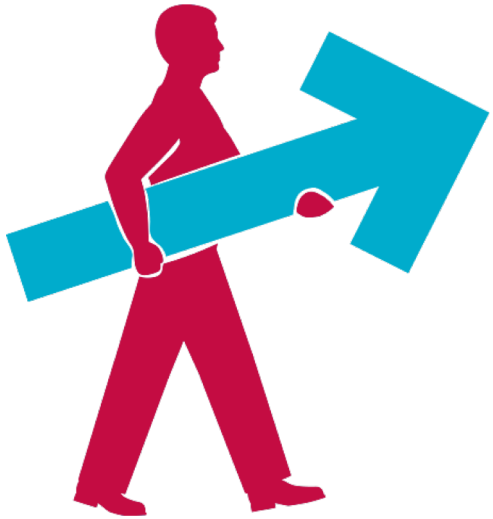


	Metabolites signal intensity after stress tasks
More intense	Propionate
	Beta hydroxybutyrate
	Acetate
	Cystein
Less intense	Lactate
	Glucose
	methionin
	Choline
	Pyruvate

Conclusion

- Preliminary results are encouraging
- Stress related metabolites unvealed
- Modified protocol to include speech signal recordings

Outlooks



- Carrying on TSST study
- Method validation
- Enforce the method into a driving /plane simulator for collecting datas

Thank you for your attention !

Any question ?