

Heart rate variability in electronic cigarette users a randomized placebo-controlled crossover trial

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Heart rate variability in electronic cigarette users



E-CIG?



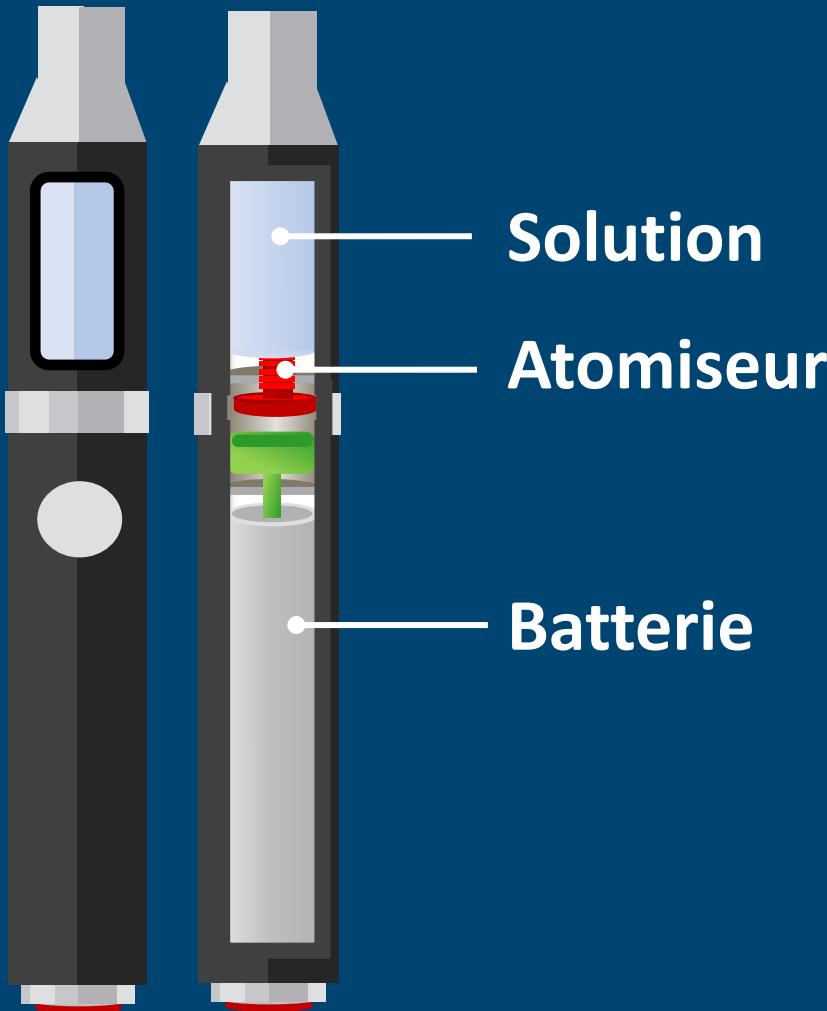
HRV?



RÉSULTATS



CONCLUSION





Arômes

> 7000 variétés sur le marché



Nicotine

Concentration Variable

Delivery solvent

Propylene glycol (PG)



Glycerol (G)



"Generally Recognized As Safe" compounds

?

?

?



Arômes

Nicotine

Delivery solvent

Propylene glycol (PG)

Glycerol (G)

Effets délétères connus

Diacetyl
Benzaldehyde
Cinnamaldehyde
Acetoin,...

Nicotine

Formaldéhyde
Propionaldéhyde
Acétaldéhyde
Acroléine,...

+ Autres toxiques



Arômes

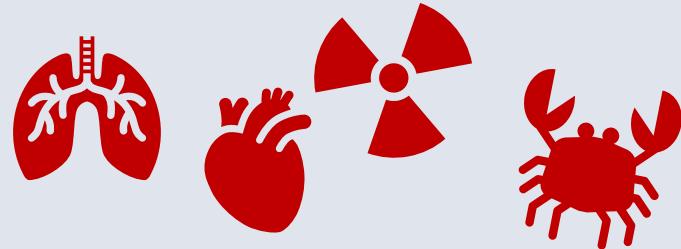
Nicotine

Delivery solvent

Propylene glycol (PG)

Glycerol (G)

Effets délétères connus
Contexte ≠ E-cig

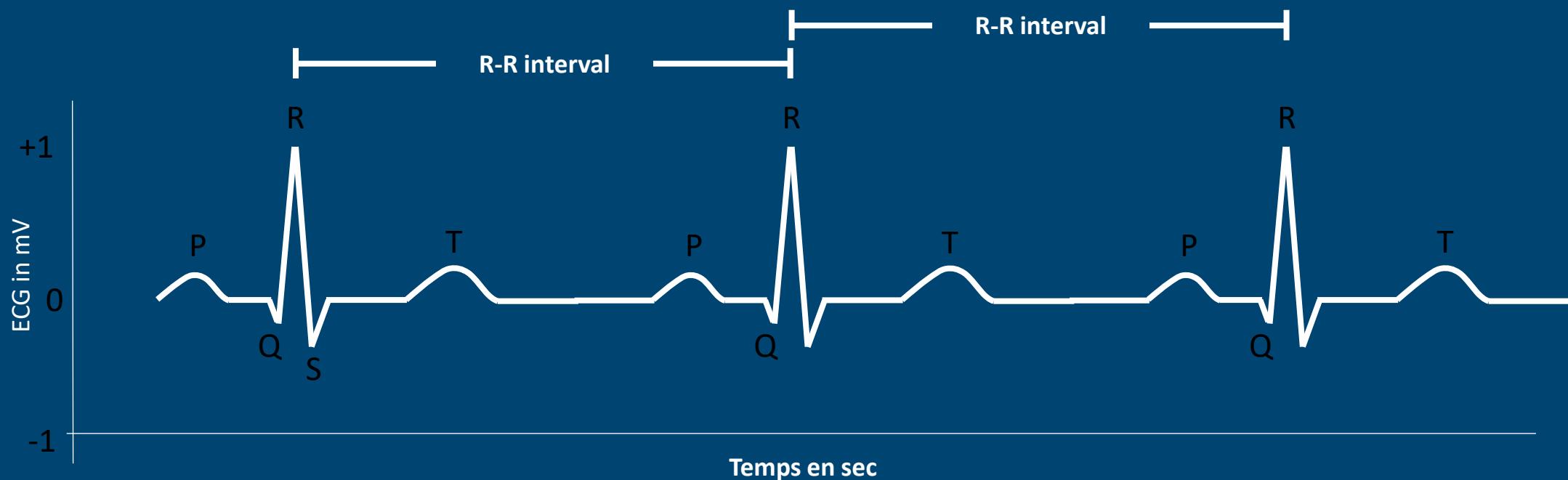




Effets délétères connus
Contexte ≠ E-cig

**Effets courts et
longs termes
limités** ?

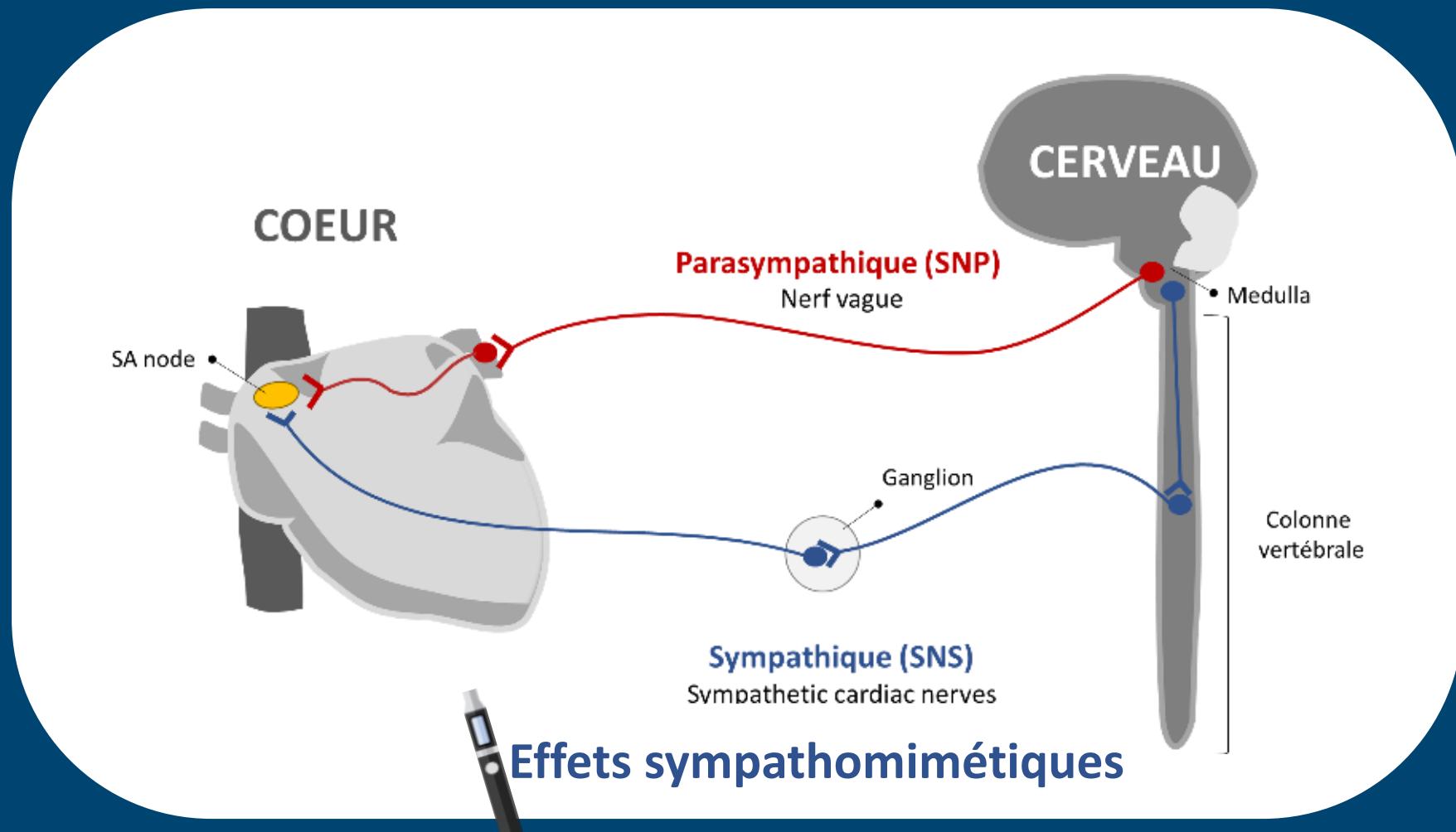
HRV = Variabilité de la fréquence cardiaque



=Variation des intervals de temps entre 2 battements

HRV

= Variabilité de la fréquence cardiaque





Effets sympathomimétiques



Impact Vapotage aigue / réversible



Vapoteurs Réguliers

3 Sessions Étudiées

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RESEARCH ARTICLE | Electronic Cigarettes: Not All Good News?

Short halt in vaping modifies cardiorespiratory parameters and urine metabolome: a randomized trial

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cardiac oxygen tension, likely as a result of lung gas exchange disturbance.

electronic nicotine delivery systems; metabolome; nicotine; propylene glycol; transcutaneous oxygen tension.

INTRODUCTION

Propylene glycol and glycerol, the main constituents of electronic cigarette (e-cigarette) liquid (e-liquid), produce an aerosol when heated that carries flavoring and nicotine. High-wattage vaping, which enhances heat and aerosol production, is the modality of choice for regular users (vapers) (10–12, 57). High-wattage vaping, with and without nicotine, has been shown to induce transcutaneous hypoxia, constriction of the airways, and lung inflammation in healthy naïve vapers (10, 12). The latter was marked by a rise in serum club cell secretory protein 16 (CC16) without a change in surfactant protein-D (10–12). Acute nicotine-free vaping increased pulmonary capillary permeability, and complete cessation of vaping 5 days before the authors began. Malathriptan, methacholine analysis was used to verify subjects' protocol compliance. Biologically relevant parameters were assessed at the beginning of each session (baseline) and after each of the three sessions. Compared to the baseline and nicotine-free sessions, a specific metabolic signature characteristic for stop-smokers, baseline serum club-cell protein-16 was higher during the stop-session than the other sessions ($P < 0.01$), and heart rate was higher in the nicotine-naïve ($P < 0.001$). Compared to acute skin-vaping in the stop-session, acute nicotine-vaping (nicotine-naïve) and acute nicotine-free vaping (nicotine-free-naïve) slightly decreased skin oxygen tension ($P < 0.05$). In regular e-cigarette users, short-term vaping cessation seemed to shift baseline urine metabolome and increased serum club-cell protein-16 concentrations, suggesting a decrease in lung inflammation. Additionally, acute vaping with and without nicotine decreased skin oxygen tension in heavy tobacco smokers (acute vaping), suggesting lung gas exchange disturbances (12).

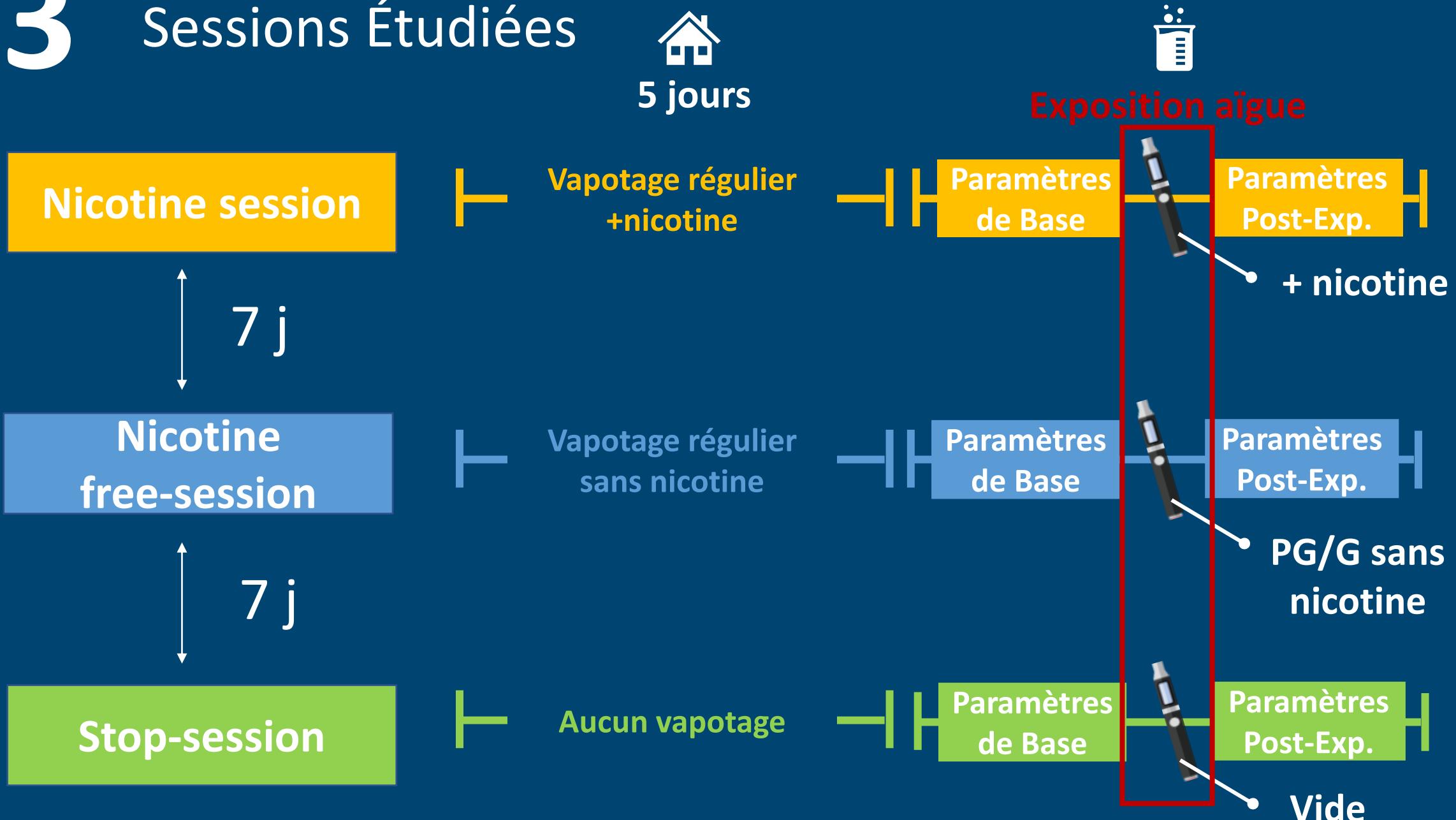
Propylene glycol and glycerol are small hydrophilic molecules that easily cross the lung epithelium (19, 21, 42). When vapers in large amounts, however, they can potentially accumulate in the lungs (22) and interact with the epithelium (50). This hydroscopic and hygroscopic deposit could theoretically disrupt the respiratory properties of surfactant and macro (21, 23, 31, 49–50, 52), resulting in bronchiolar and alveolar collapse and therefore impairments in lung gas exchange (40). This possibility is supported by *in vitro* and animal studies (21, 43, 56, 59), but it is not known if it also occurs in humans (40). We hypothesized that short-term cessation of vaping in regular heavy e-cigarette users would completely clear aerosol deposit from the lungs, with subsequent recovery of gas exchange and restoration of biological/clinical cardiorespiratory parameters. We also explored whether e-cigarette cessation for 5 days could shift serum and urine

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3 Sessions Étudiées



HRV analyses

Nicotine session

Nicotine
free-session

Stop-session

Paramètres de Base

Exposition aigüe

Paramètres Post-Exp.

+5min

+30min

+50min

5min

5min

5min

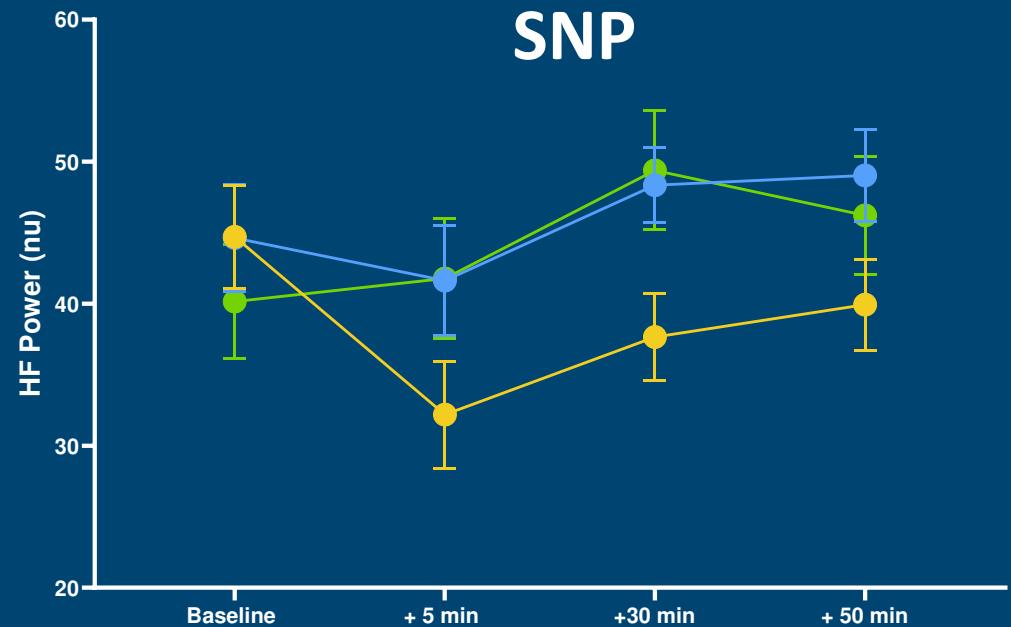
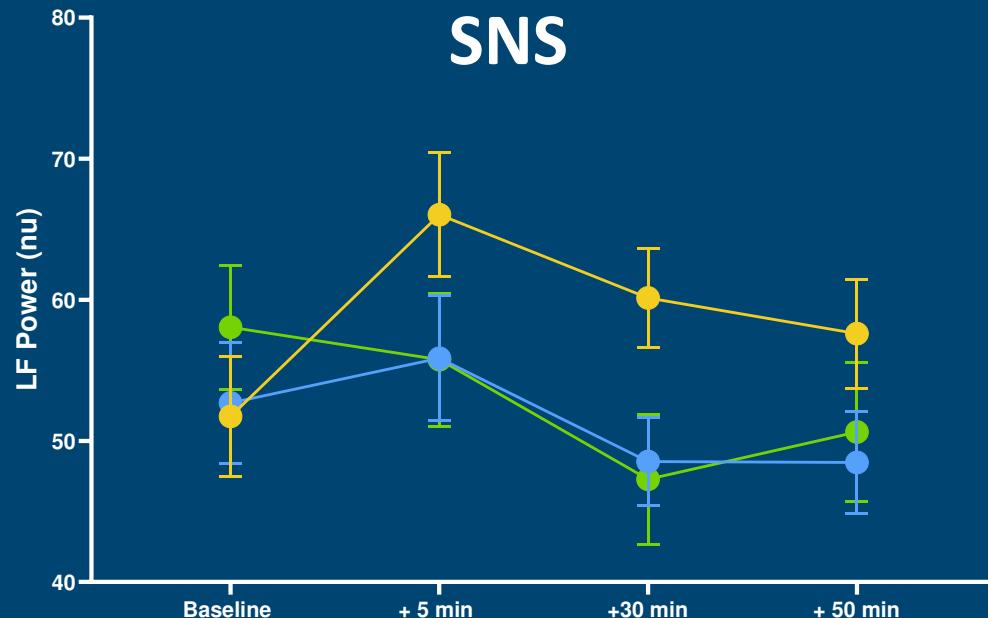
5min



Résultats Principaux

Méthode: frequency-domain

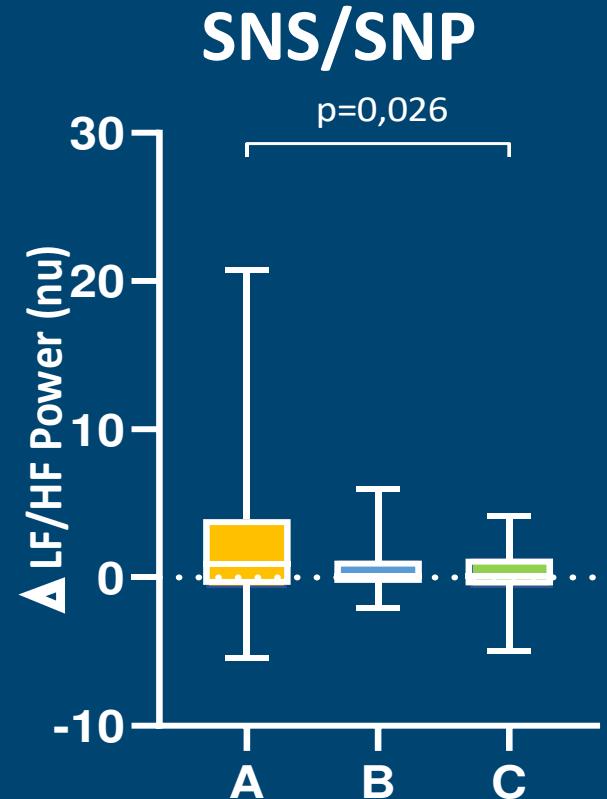
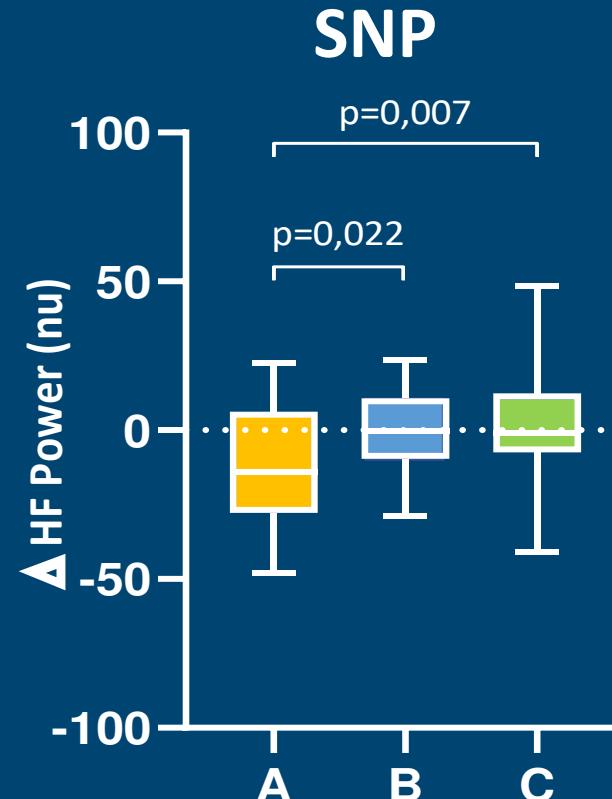
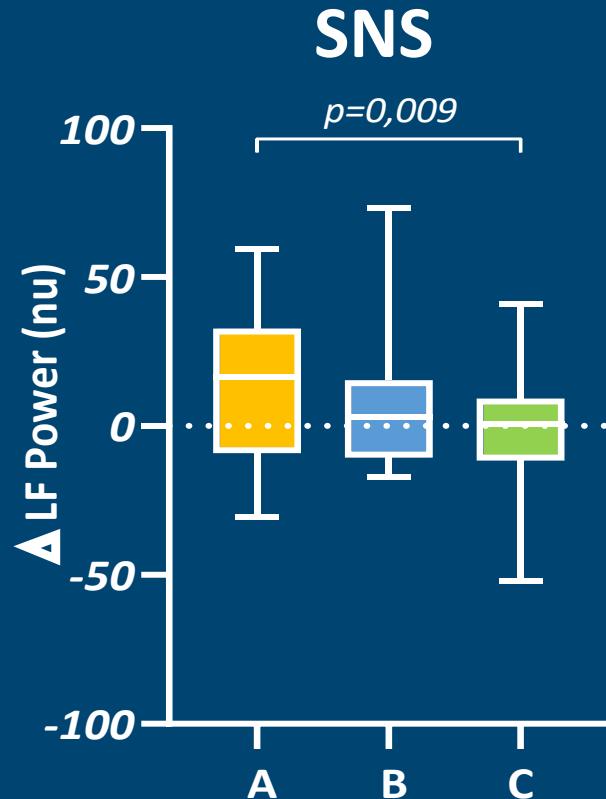
- Nicotine session
- Nicotine free-session
- Stop session



L'exposition aiguë à la nicotine ↑ l'activité du SNS
Prédominance SNS < Nicotine et non des autres composants

Résultats Principaux

Méthode: frequency-domain



L'exposition aiguë à la nicotine ↑ l'activité du SNS

Conclusions & Perspectives

- L'exposition aiguë à la nicotine ↑ l'activité du SNS.
- Prédominance SNS < Nicotine et non des autres composants.
- Arrêt à court terme pas d'impact sur le HRV.

Impact de l'arrêt à long terme /réversibilité de l'effet de la E-cig et sa prédominance sur le SNS ?

Merci pour votre attention.

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