EFFICACY E-CIGS: LAB STUDIES

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EFFICACY E-CIG: lab studies

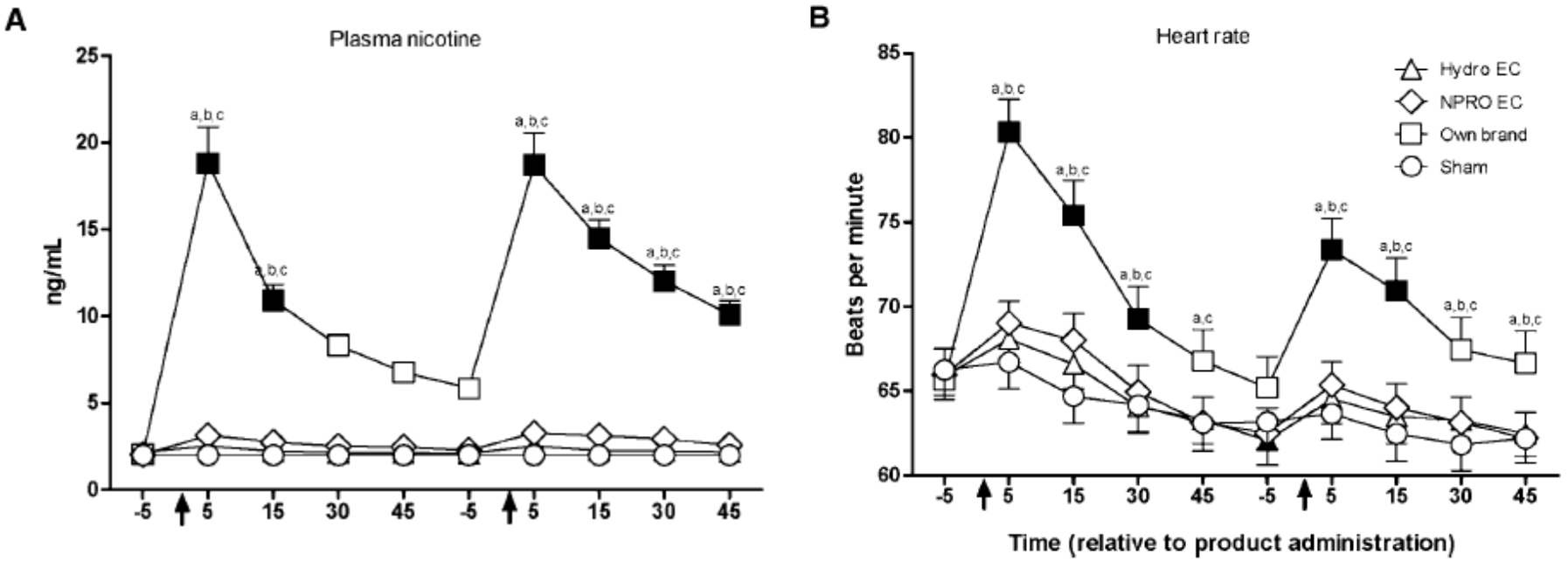

Figure 1. Mean data for nicotine blood plasma (A) and heart rate (B) as a function of condition and time. *X*-axes, time in minutes relative to product administration; arrows, first and second product administrations. *Y*-axes, A, nicotine blood plasma concentration (ng/mL); B, heart rate (beats per minute); filled symbols, significant difference from baseline. An "a," "b," or "c" indicates that own brand was significantly different from sham, Hydro EC, or NPRO EC at that time point. A "d" indicates that Hydro EC was significantly different from sham at that time point. An "e" indicates that NPRO EC was significantly different from sham at that time point (Tukey's HSD, $P < 0.05$). Unidirectional error bars, 1 SE.

Source*:* A clinical laboratory model for evaluating the acute effects of electronic "cigarettes": Nicotine delivery profile and cardiovascular and subjective effects. *Cancer Epidemiol Biomarkers Prev,* 2010, 19: 1945.

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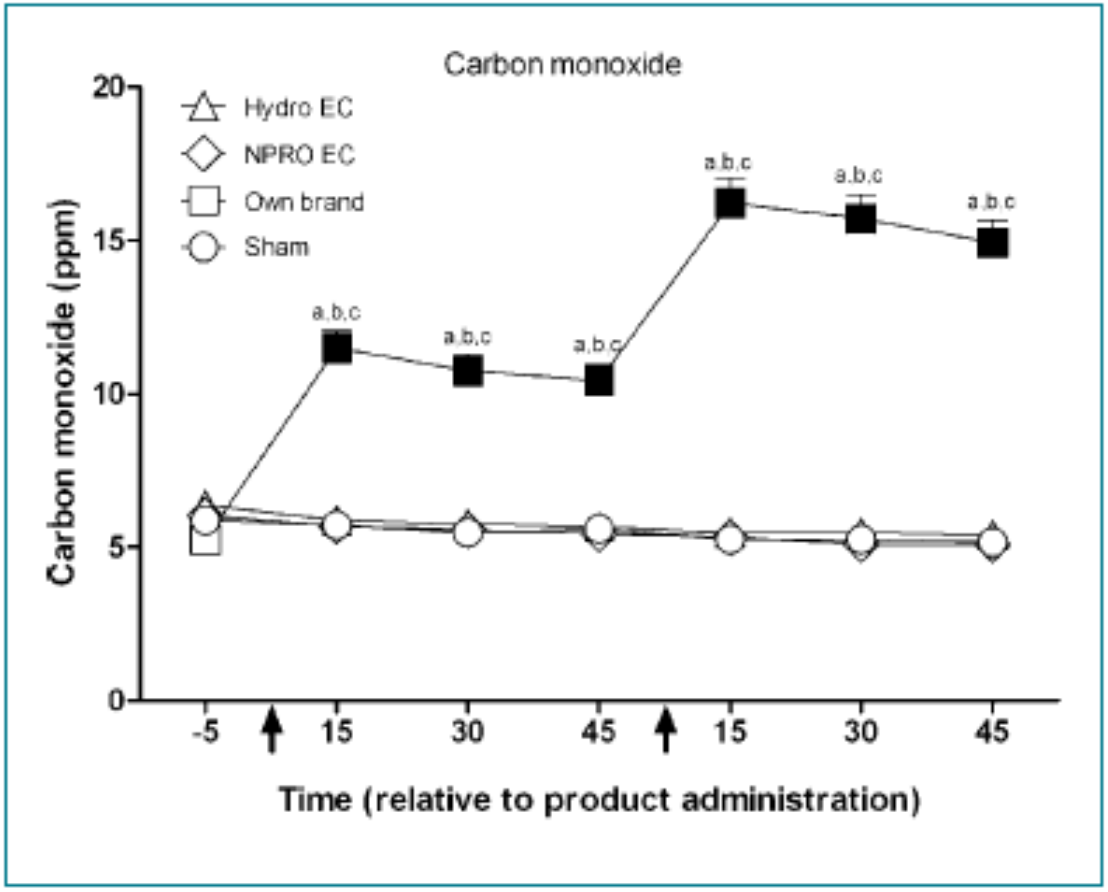

Figure 2. Mean data for carbon monoxide (CO) as a function of condition and time. *X*-axis, time in minutes relative to product administration; arrows, first and second product administrations. *Y*-axis, CO in parts per million (ppm); filled symbols, significant difference from baseline. An "a," "b," or "c" indicates that own brand was significantly different from sham, Hydro EC, or NPRO EC at that time point. A "d" indicates that Hydro EC was significantly different from sham at that time point. An "e" indicates that NPRO EC was significantly different from sham at that time point (Tukey's HSD, $P < 0.05$). Unidirectional error bars, 1 SE.

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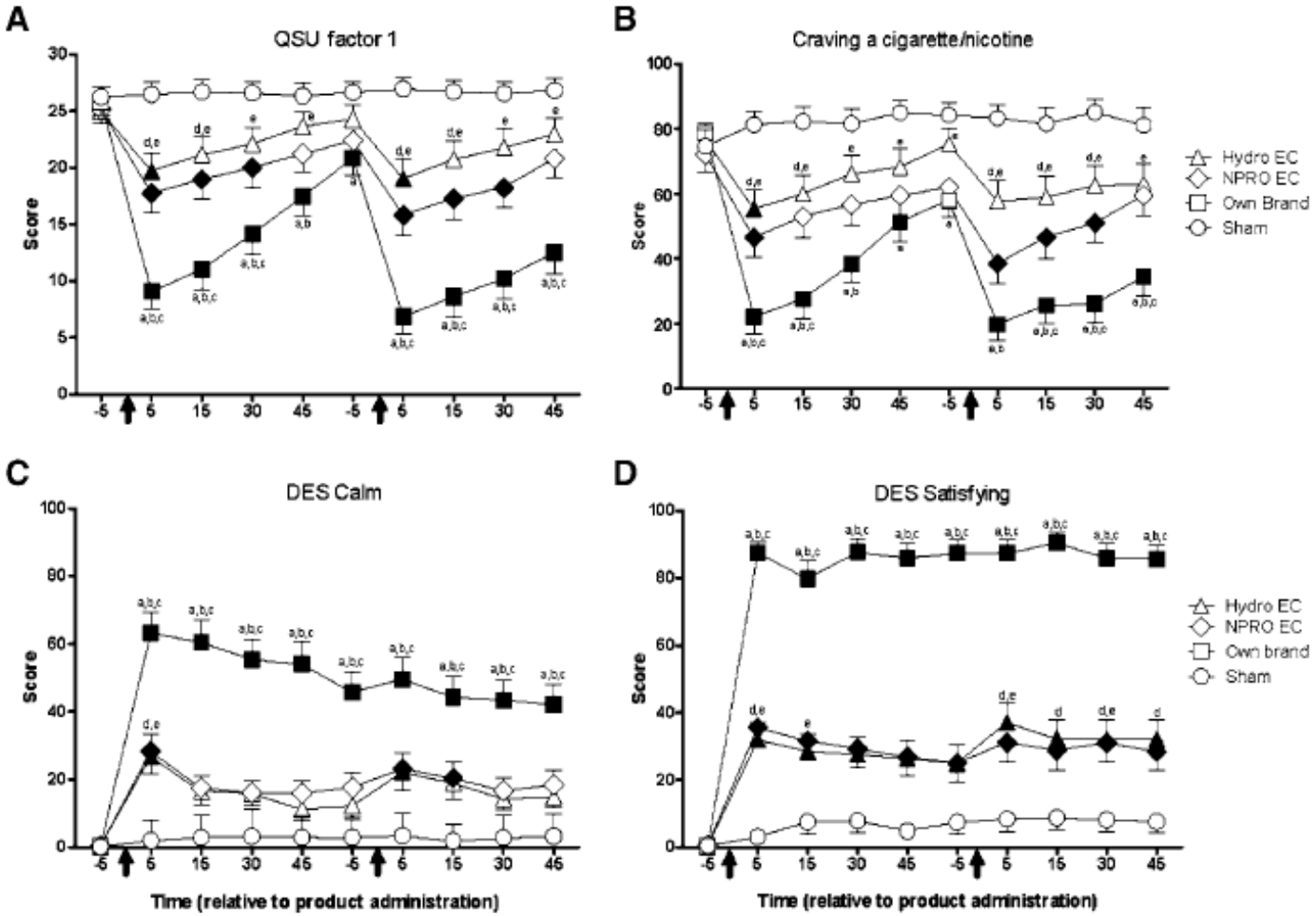

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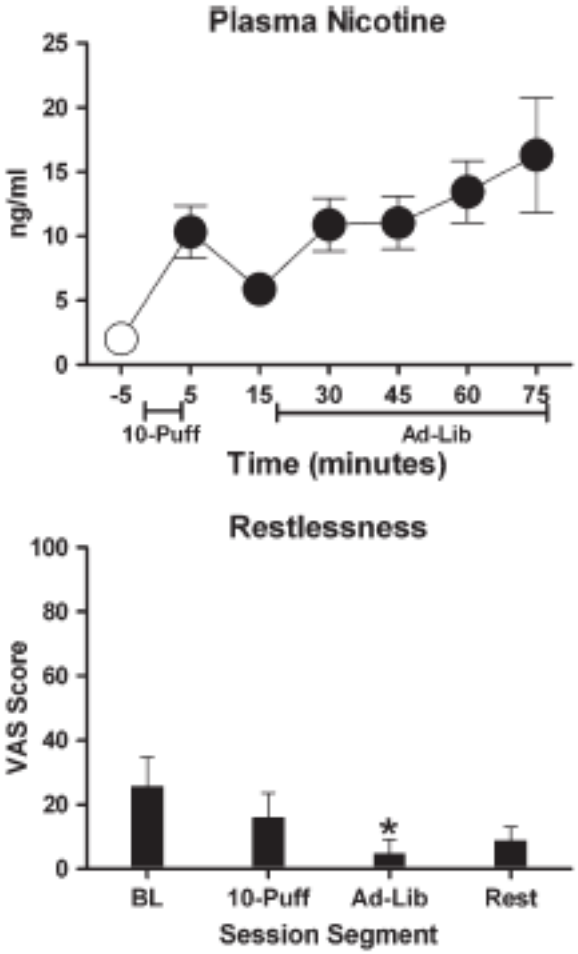

Figure 1. Top panel: *M* (±1 *SEM*) plasma nicotine (assay's limit of quantitation = 2 ng/ml; Breland, Kleykamp, & Eissenberg, 2006) levels at baseline (−5) and during the 10-puff and 1-hr ad lib puffing periods. Filled symbols indicate a significant difference from baseline. Bottom panel: *M* (+1 *SEM*) response to a visual analogue scale item assessing "restlessness" (0–100 scale) at baseline and the end of the 10-puff, ad lib, and rest periods. An asterisk indicates a significant difference from baseline. Data are from eight electronic cigarettes (EC) using participants who abstained from ECs for at least 12 hr before session. Paired *t* tests were used to compare means, $p \leq .05$.

Source*:* Electronic cigarettes: Effective nicotine delivery after acute administration. *Nicotine Tob Res*, 2013, 15: 267-270.

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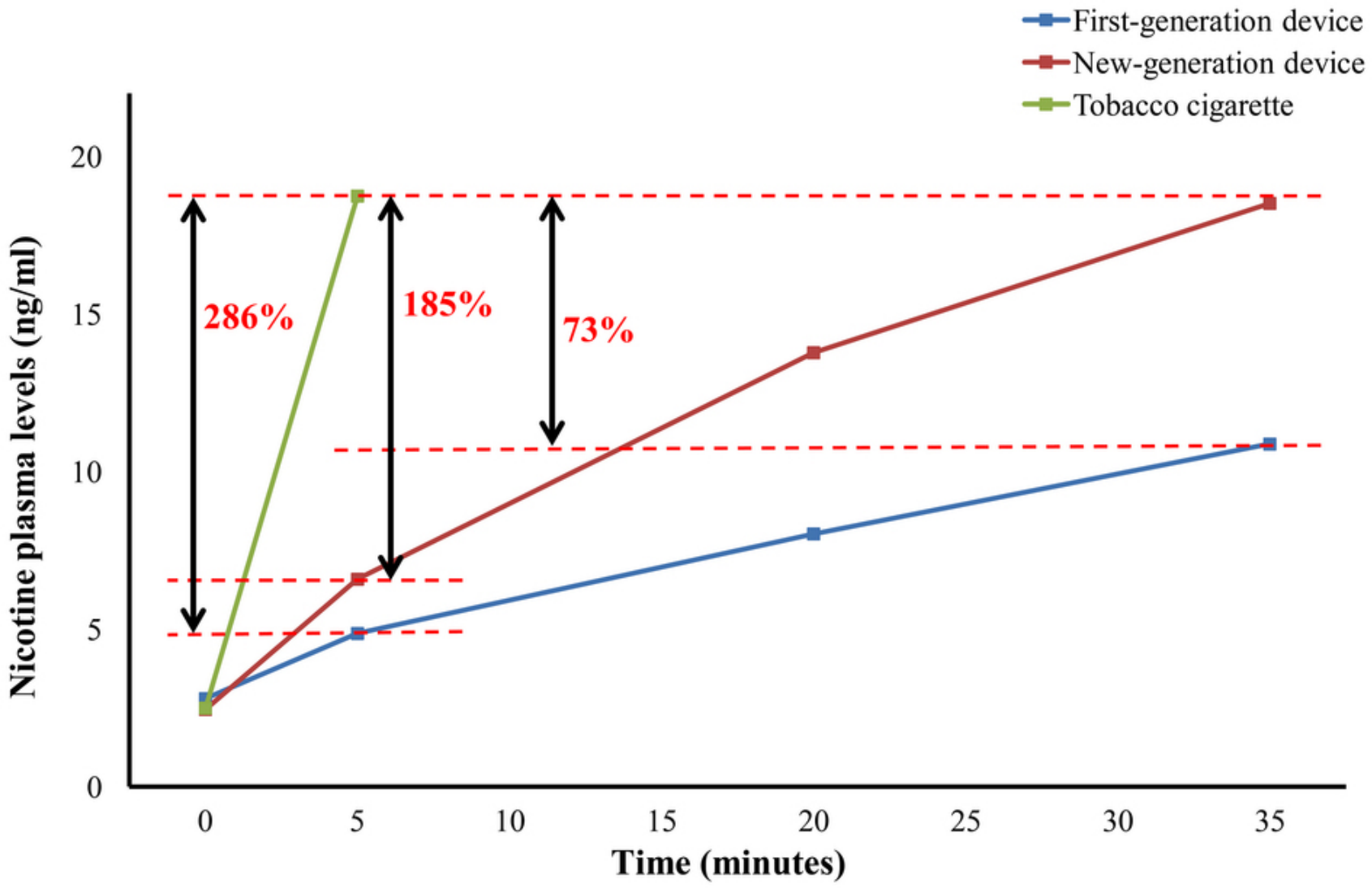

Source*:* Nicotine absorption from electronic cigarette use: comparison between first and new-generation devices. *Scientific Reports* , 2014, 4: 4133.

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NICOTINE FLUX

Table 1. Measured Total Particulate Matter and Nicotin

Profile	Puff duration (s)	TPM (mg)	Nicotine yield (mg)	Nicotine flux (µg/s)
Tobacco cigarette smoker	2	9.07 ± 2.3	0.11 ± 0.02	3.8 ± 0.69
Average experienced ECIG (slow)	4	29.4 ± 0.9	0.30 ± 0.01	4.9 ± 0.13
Average experienced ECIG (fast)	4	29.6 ± 6.4	0.29 ± 0.08	4.9 ± 1.3
Extreme experienced ECIG (slow)	8	70.5 ± 13.0	0.72 ± 0.10	6.0 ± 0.80
Extreme experienced ECIG (fast)	8	68.8 ± 6.7	0.68 ± 0.07	5.6 ± 0.61
Tobacco cigarette smoker	2	64.9 ± 9.8	0.64 ± 0.10	21 ± 3.2
Average experienced ECIG (slow)	4	128.3 ± 23.1	1.18 ± 0.28	20. ± 4.7
Average experienced ECIG (fast)	4	152.7 ± 13.6	1.50 ± 0.07	25 ± 1.1
Extreme experienced ECIG (slow)	8	312.6 ± 32.9	3.23 ± 0.34	27 ± 2.9
Extreme experienced ECIG (fast)	8	333.2 ± 34.0	3.09 ± 0.19	26 ± 1.5
Average experienced ECIG (slow)	4	32.7 ± 7.4	0.48 ± 0.13	8.0 ± 2.1
Extreme experienced ECIG (slow)	8	314.0 ± 29.4	4.70 ± 1.00	39 ± 7.0

ECIG = electronic cigarette; TPM = total particulate matter.
The profiles represent a typical tobacco cigarette smoker and experienced ECIG users using
conditions (3.3 and 5.2V). All conditions were tested using an 8.53-mg/ml nicotine concentr

Source: Effects of user puff topography, device voltage, and liquid nicotine concentration on electronic cigarette nicotine yield: measurements and model predictions. *Nicotine & Tobacco Research*, 2015, 150–157.

SUMMARY EFFICACY: lab studies

substantial/effective **nicotine delivery**

- pharmacokinetics different from smoking
- in between classical NRT & smoking
- moderator variables
  - experience
  - device & nicotine concentration

substantial/effective **craving reduction**

- not just nicotine
- importance of conditioned stimuli (CSs): troath hit, flavor, hand-to-mouth motor behavior, (visual) vapour inhalation/exhalation…