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Sigarette elettroniche a riscaldamento del tabacco: effetti tossicologici *in vivo*

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FORUM

NUOVI MESSAGGI

MARKETPLACE

MERCATINO USATO

CALCOLATORI



— NEWS —

SIGARETTE ELETTRONICHE. "ZERO RISCHI"



DIFFERENCE BETWEEN

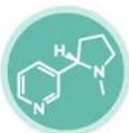
HEATS TOBACCO



USES REAL
TOBACCO



NICOTINE
NATURALLY
PRESENT IN
TOBACCO



NO ASH,
NO SMOKE



HEATED
TOBACCO

VS



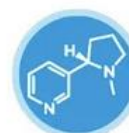
E-CIGARETTE



VAPORIZES E-LIQUID



NO TOBACCO



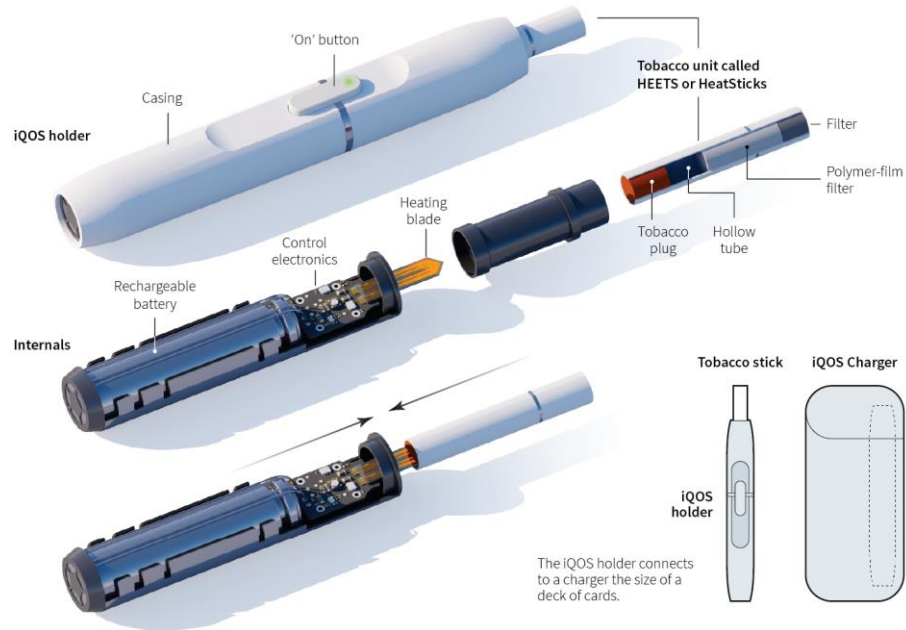
NICOTINE
DERIVED FROM
TOBACCO ADDED
IN E-LIQUID



NO ASH,
NO SMOKE

Philip Morris' IQOS

Philip Morris International's IQOS heats tobacco instead of burning it, releasing nicotine-laced vapor. The company says that means the device avoids subjecting smokers to the same levels of carcinogens and other toxic substances found in a regular cigarette.



Sources: Philip Morris International; TechInsights Inc



IQOS is an electronic device that heats up **REAL TOBACCO** instead of burning it

IQOS 是款加热不燃烧产品, 将烟草加热而不燃烧烟草
IQOS merupakan peranti elektronik yang memanaskan tembakau sebenar dan bukan membakar



Temperatura di riscaldamento 300 – 350°C

FDA Authorizes Marketing of the **IQOS** Tobacco Heating System as a Modified Risk Tobacco Product

The modified risk tobacco product

*«Exposure to harmful chemicals is reduced
if a user switches completely to IQOS from
combustible cigarettes» FDA*



Table. Concentrations of 8 Volatile Organic Compounds, 16 Polycyclic Aromatic Hydrocarbons, 3 Inorganic Compounds, and Nicotine in Mainstream Aerosol and Temperature of the HNB IQOS Cigarette and Conventional Cigarettes

Analyzed Compound	HNB Cigarette		Conventional Cigarette		Proportion of the Chemical in HNB and Conventional Cigarettes, %
	Amount, Mean (SD)	No. of Replications for Each Assay	Amount, Mean (SD)	No. of Replications for Each Assay	
Volatile organic compounds, µg per cigarette ^a					
Acetaldehyde	133 (35)	5	610 ^b	1	22
Acetone	12.0 (12.9)	5	95.5 (13.5)	2	13
Acrolein	0.9 (0.6)	2	1.1	1	82
Benzaldehyde	1.2 (1.4)	5	2.4 (2.6)	2	50
Crotonaldehyde	0.7 (0.9)	5	17.4	1	4
Formaldehyde	3.2 (2.7)	5	4.3 (0.4)	2	74
Isovaleraldehyde	3.5 (3.1)	5	8.5 (10.8)	2	41
Propionaldehyde	7.8 (4.3)	5	29.6 (36.6)	2	26
Polycyclic aromatic hydrocarbons, ng per cigarette ^a					
Naphthalene	1.6 (0.5)	4	1105 (269)	7	0.1
Acenaphthylene	1.9 (0.6)	4	235 (39)	7	0.8
Acenaphthene	145 (54)	4	49 (9)	7	295
Fluorene	1.5 (0.6)	4	371 (56)	7	0.4
Anthracene	0.3 (0.1)	4	130 (18)	7	0.2
Phenanthrene	2.0 (0.2)	4	292 (44)	7	0.7
Fluoranthene	7.3 (1.1)	4	123 (18)	7	6
Pyrene	6.4 (1.1)	4	89 (15)	7	7
Benz[a]anthracene	1.8 (0.4)	4	33 (4.2)	7	6
Chrysene	1.5 (0.3)	4	48 (6.2)	7	3
Benzo[b]fluoranthene	0.5 (0.2)	4	24 (2.9)	7	2
Benzo[k]fluoranthene	0.4 (0.2)	4	4.3 (2.8)	7	9
Benzo[a]pyrene	0.8 (0.1)	4	20 (2.9)	7	4
Indeno[1,2,3-cd]pyrene	ND	4	NA	NA	NA
Benzo[ghi]perylene	ND	4	NA	NA	NA
Dibenzo[a,h]anthracene	ND	4	NA	NA	NA
Inorganics, ppm in the mainstream smoke ^d					
Carbon dioxide	3057 (532)	5	>9000	3	NA
Carbon monoxide	328 (76)	5	>2000	3	NA
Nitric oxide	5.5 (1.5)	5	89.4 (71.6)	3	6
Other measures					
Nicotine, µg per cigarette ^a	301 (213)	4	361	1	84
Temperature, °C	330 (10)	2	684 (197)	1	NA
Puff total count	12.6 (2.4)	32	13.3 (3.1)	6	NA

Abbreviations: HNB, heat-not-burn; NA, not analyzed; ND, not detected.

^aWe applied the methods described previously in Varlet et al⁴ to analyze volatile organic compounds and nicotine.^bBecause there was only 1 replication, no SD can be computed.^cWe present values reported from Vu et al⁵ for the ISO smoking regimen and

for a mean of the 35 top-selling US cigarette brands.

^dCarbon dioxide was measured with a Testo 535 (Testo), and carbon monoxide and nitric oxide were measured with a Pac 7000 that detected carbon monoxide (Dräger). The apparatus measured the smoke when it was released from the syringe pump.

Research Letter

July 2017

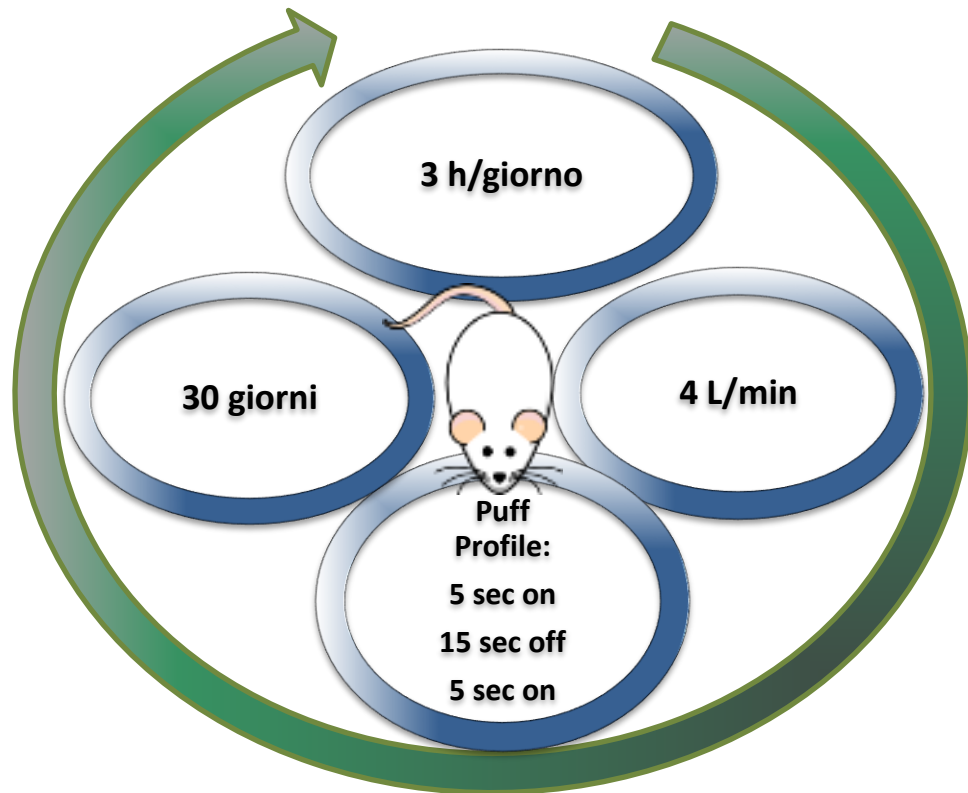
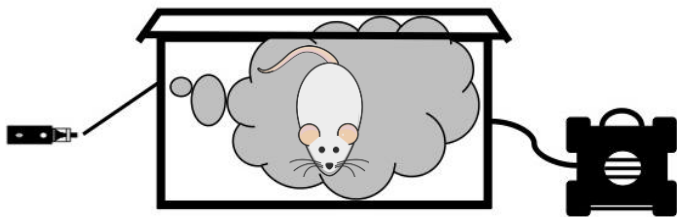
Heat-Not-Burn Tobacco Cigarettes
Smoke by Any Other NameReto Auer, MD, MAS^{1,2}; Nicolas Concha-Lozano, PhD³; Isabelle Jacot-Sadowski, MD²; et al

» Author Affiliations | Article Information

JAMA Intern Med. 2017;177(7):1050-1052. doi:10.1001/jamainternmed.2017.1419

Auer R et al., 2017 JAMA Intern Med

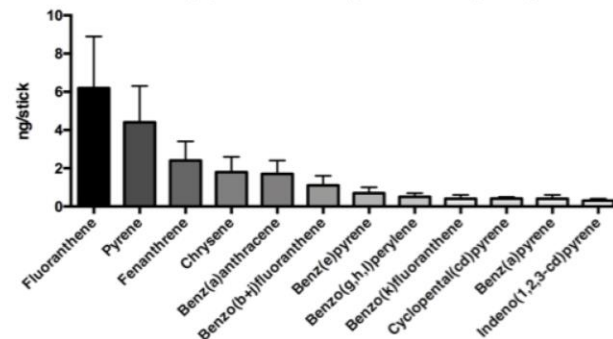
Total-body exposition



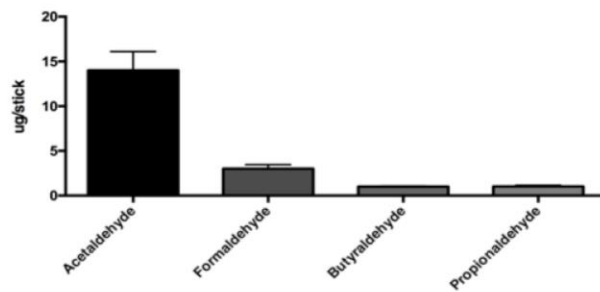


Parameter	Method
Powders - inhalable fraction	M.U. 1998:13
Nitrogen oxides (such as NO ₂)	NIOSH 6014 1994
Nicotine	NIOSH 2513 1998
Aldehydes	EPA 8315A 1996
Phenols and Cresols	NIOSH 2546 1994
Volatile Organic Compounds (VOCs)	UNI EN ISO 14617-1:2002
BTEX	UNI EN ISO 14617-1:2002
Metals	UNI EN 14902:2005/EC1:2008 + UNI EN ISO 17294-2:2016
Polycyclic Aromatic Hydrocarbons (PAH)	DM 05/05/2013 GU n°128 05/06/2016

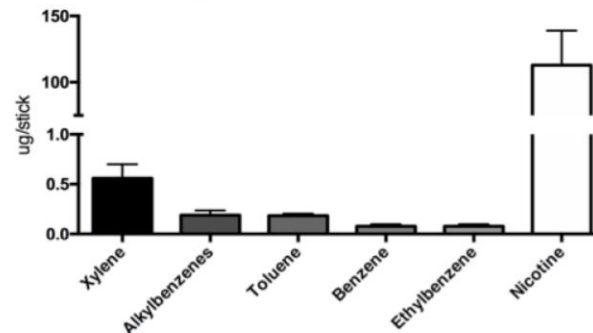
Polycyclic aromatic hydrocarbons (PAHs)



Aldehydes



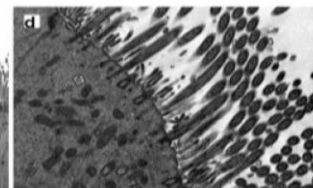
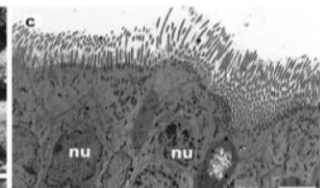
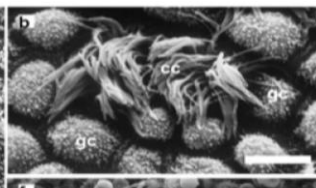
Volatile organic compounds (VOCs) and nicotine



Vivarelli F. et al., 2021 Nicotine & Tobacco Research

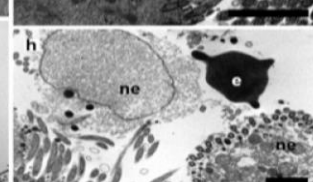
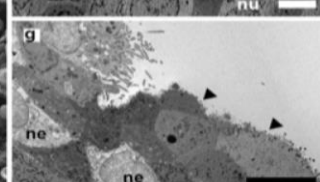
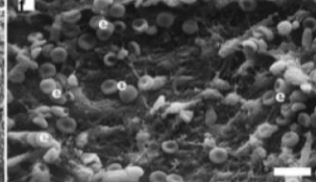
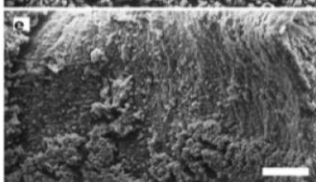
Modificazioni strutturali a livello della trachea e del parenchima polmonare

CTRL



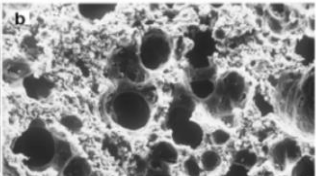
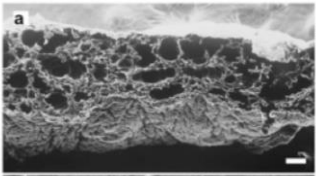
CTRL

IQOS

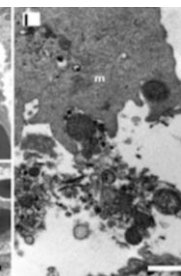
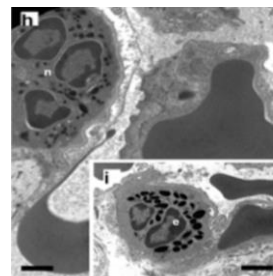
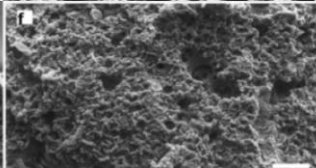
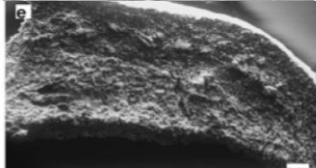


IQOS

CTRL

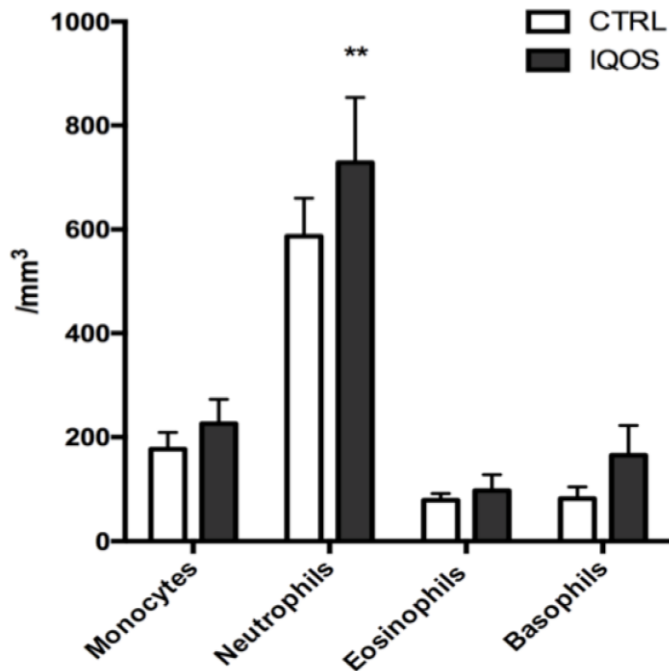


IQOS



IQOS

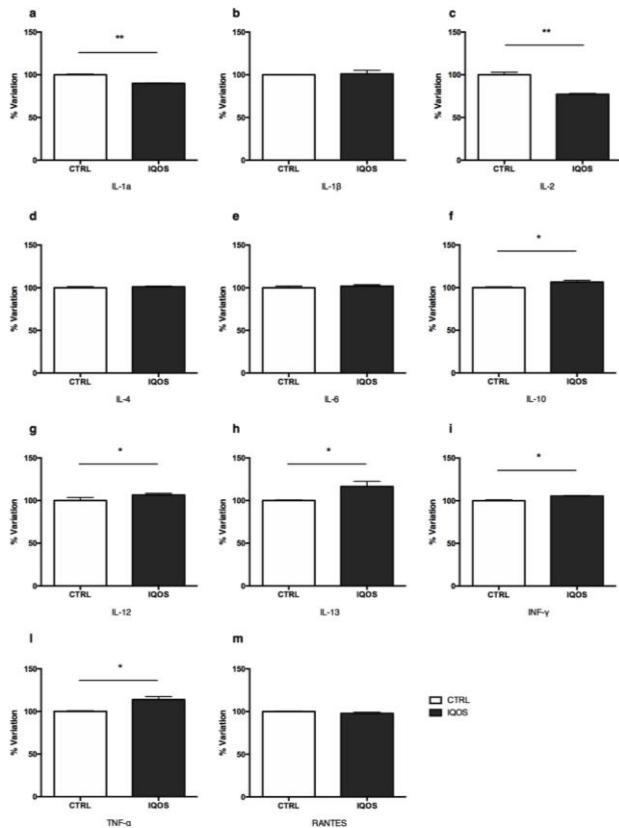
Immagini tratte da
Vivarelli F. et al., 2021
Nicotine & Tobacco
Research



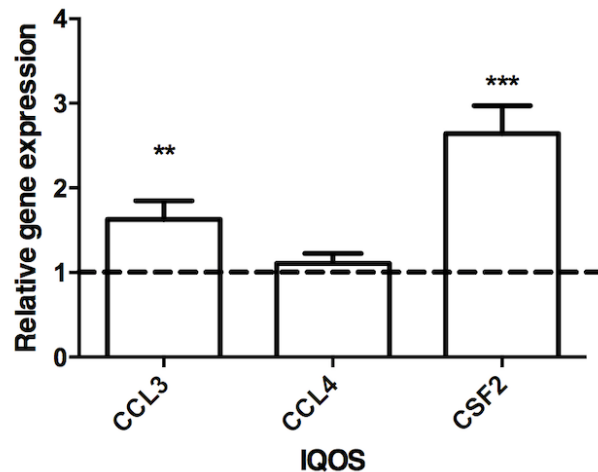
Alterazione del profilo leucocitario

Immagini tratte da
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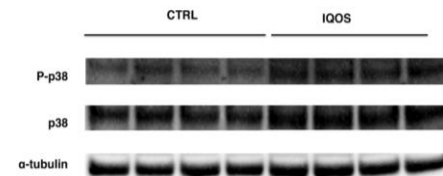
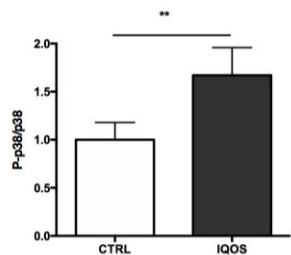
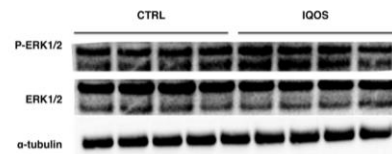
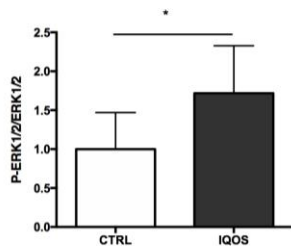
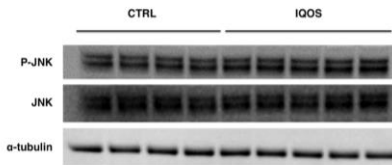
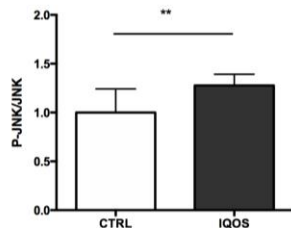
** $P < 0.01$; t-test a due code per dati non appaiati



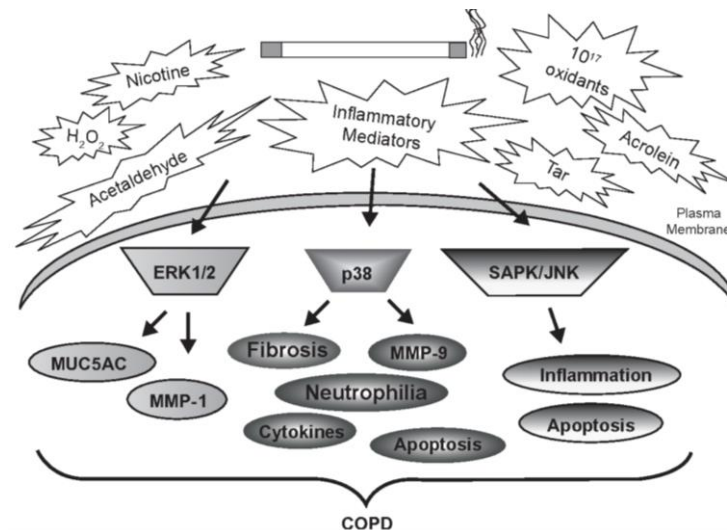
Mediatori dell'inflammatione



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* $P < 0.05$; ** $P < 0.01$; ANOVA – Dunn post – hoc test

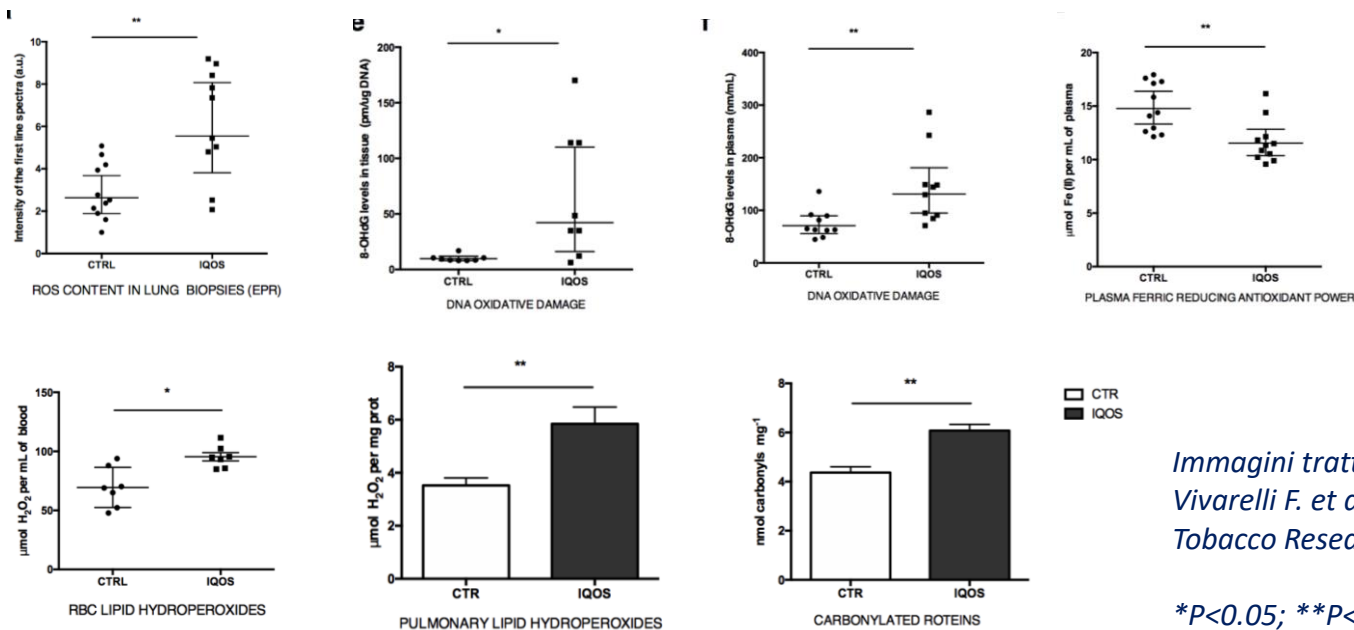


MAP chinasi



Immagini tratte da
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* $P < 0.05$; ** $P < 0.01$; ANOVA – Dunn post – hoc test

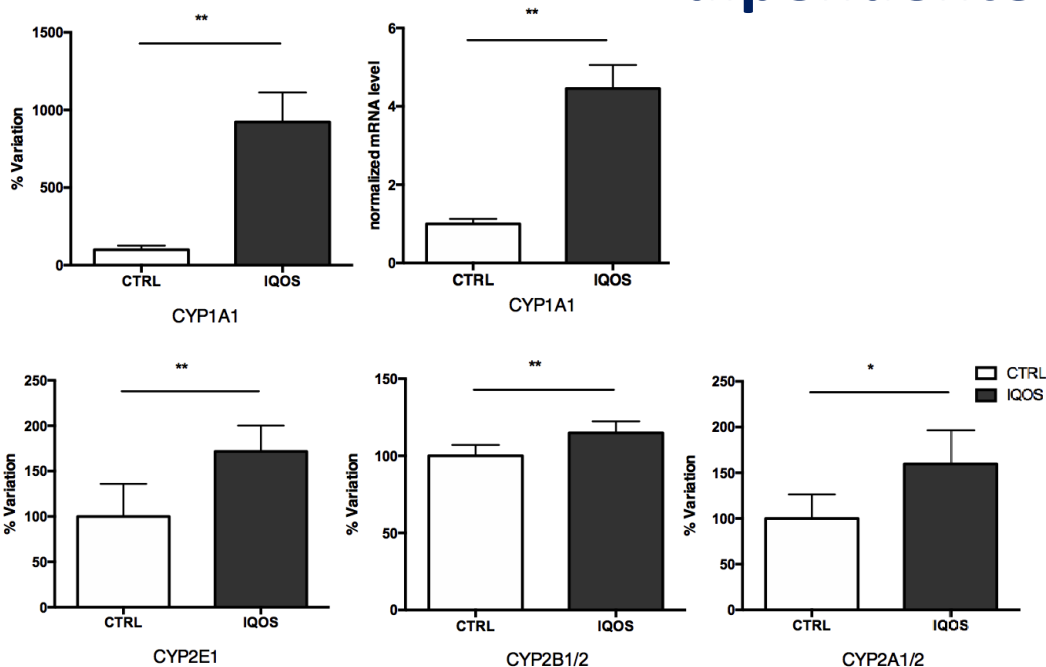
Radicali liberi e danno ossidativo



Immagini tratte da
Vivarelli F. et al., 2021 *Nicotine &
Tobacco Research*

* $P < 0.05$; ** $P < 0.01$; t-test a due code per
dati non appaiati

Modulazione dell'attività monoossigenasica CYP-450 dipendente

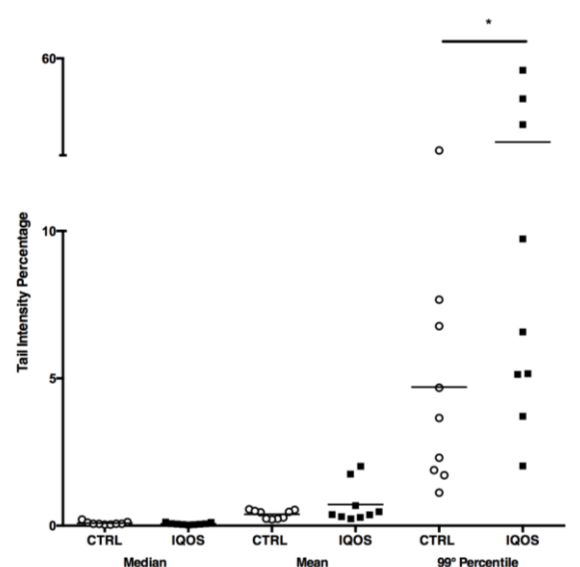
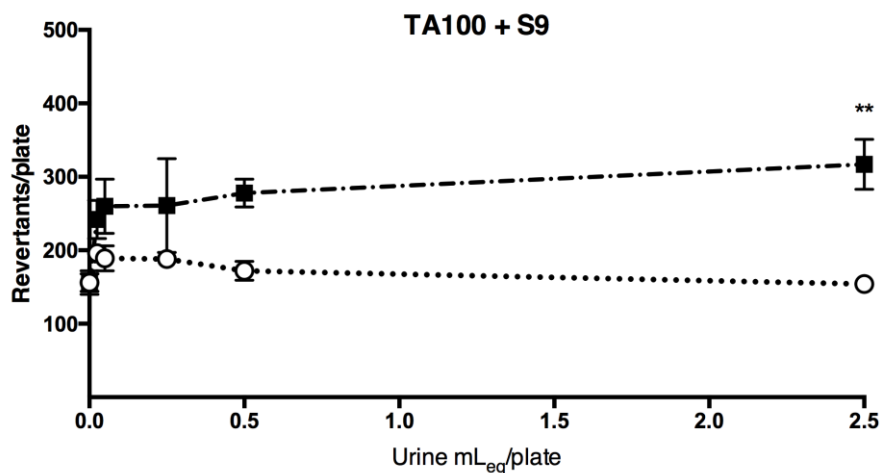


Immagini tratte da
Vivarelli F. et al., 2021 Nicotine & Tobacco
Research

* $P < 0.05$; ** $P < 0.01$; t-test a due code per dati non appaiati



Mutagenesi



Immagini tratte da

Vivarelli F. et al., 2021 *Nicotine & Tobacco Research* * $P < 0.05$; ** $P < 0.01$; ANOVA – Bonferroni post hoc test

Take-Home Message

Il sistema Heat-not-Burn IQOS rilascia livelli concentrazioni significativamente inferiori di alcune sostanze tossiche rispetto alle comuni sigarette

Il presente studio mostra tuttavia come l'esposizione ad IQOS porti ad alterazioni tissutali a livello polmonare e modificazioni genetiche ed epigenetiche tipicamente osservate nei modelli sperimentali di esposizione al fumo

Sono necessari studi a lungo termine per comprendere a fondo il rischio associato a tali dispositivi

Importanza della corretta comunicazione ai consumatori

Grazie per l'attenzione



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Teresa Rodriguez
Estrada



Dott.ssa Eleonora
Turrini



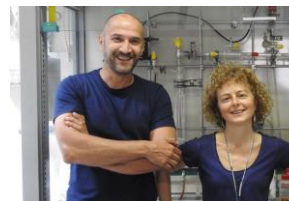
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