Electronic Cigarettes

Panagis Galiatsatos, MD, MHS
Assistant Professor
Director, Tobacco Treatment Clinic at Johns Hopkins
Co-director, Medicine for the Greater Good
Co-Director, Health Equity Steering Committee of JHHS
Division of Pulmonary and Critical Care Medicine
Johns Hopkins Bayview Medical Center
Johns Hopkins School of Medicine

Anatomy of an Electronic Cigarette

An e-cigarette is a battery-operated nicotine delivery device consisting of a heating chamber and a liquid-containing cartridge.

Klager et al. Env Sci & Techn. 2017
Anatomy of an Electronic Cigarette

CONTENTS
Flavoring compounds
Propylene Glycol, Glycerol
Formaldehyde

All approved by the FDA
All found in the Generally Recognized as Safe list (GRAS)

BUT

CONTENTS
GRAS list compounds are tested and approved for INGESTION only, not for inhalation
Anatomy of an Electronic Cigarette

CONTENTS

e.g. Diacetyl – a flavoring used in electronic cigarettes. Used in popcorn flavoring, Pop Tarts, candy corn

Fixed Obstructive Lung Disease in Workers at a Microwave Popcorn Factory --- Missouri, 2000—2002
CDC MMWR April 2002

So… Why DO People Smoke?
Combustible Cigarettes

Variability in Cigarette (Marlboro)

Marlboro Ice | Marlboro Blast | Marlboro Refined | Marlboro Black | Marlboro Red | Marlboro Red 20S

Tar Yield (mg/cig) | Nicotine (mg/cig)

https://www.premiumecigarette.com/
Long term changes

- Increased density of nicotinic receptors
- Increased sensitivity of receptor ion channels
- Changes gene expression
  - Neuronal protein synthesis increases
  - Neurotransmitter synthesis increases
CREB versus ΔFosB

Questions

Panagis Galiatsatos, MD, MHS
Assistant Professor
Co-director, Medicine for the Greater Good
Co-Director, Health Equity Steering Committee of JHHS
Division of Pulmonary and Critical Care Medicine
Johns Hopkins Bayview Medical Center
Johns Hopkins School of Medicine

Nestler EJ & Malenka RC. Scientific America. 2014
An e-cigarette is a battery-operated nicotine delivery device consisting of a heating chamber and a liquid-containing cartridge.
Anatomy of an Electronic Cigarette

CONTENTS
Flavoring compounds
Propylene Glycol, Glycerol
Formaldehyde

All approved by the FDA
All found in the Generally Recognized as Safe list (GRAS)

BUT

Anatomy of an Electronic Cigarette

CONTENTS
GRAS list compounds are tested and approved for INGESTION only, not for inhalation
Anatomy of an Electronic Cigarette

CONTENTS

e.g. Diacetyl – a flavoring used in electronic cigarettes.
Used in popcorn flavoring, Pop Tarts, candy corn

Fixed Obstructive Lung Disease in Workers at a Microwave Popcorn Factory --- Missouri, 2000—2002

CDC MMWR April 2002

So… Why DO People Smoke?

NICOTINE
**Combustible Cigarettes**

![Combustible Cigarettes Image]

https://www.premiumecigarette.com/

**Variability in Cigarette (Marlboro)**

- Marlboro Ice
- Marlboro Blast
- Marlboro Refined
- Marlboro Black
- Marlboro Red
- Marlboro Red 20S

- Tar Yield (mg/cig)
- Nicotine (mg/cig)

[Graph showing variability in cigarette (Marlboro)]
Long term changes

- Increased density of nicotinic receptors
- Increased sensitivity of receptor ion channels
- Changes gene expression
  - Neuronal protein synthesis increases
  - Neurotransmitter synthesis increases
CREB versus ΔFosB

Questions

Panagis Galiatsatos, MD, MHS
Assistant Professor
Co-director, Medicine for the Greater Good
Co-Director, Health Equity Steering Committee of JHHS
Division of Pulmonary and Critical Care Medicine
Johns Hopkins Bayview Medical Center
Johns Hopkins School of Medicine