

***Combined Transdermal  
Administration of Nicotine and  
Bupropion for Smoking Cessation  
Therapy***

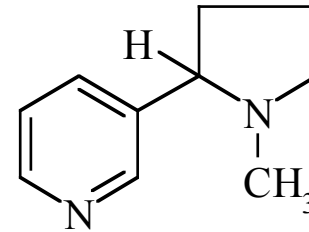
**Serena Cella, Sara Nicoli, Patrizia Santi**

**Department of Pharmacy**

**University of Parma, Italy**

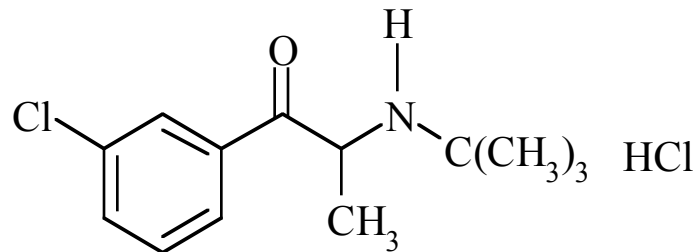
# *Smoking Cessation Therapy*

- **Nicotine replacement therapy (NRT)**
- **Nicotine pharmaceutical forms available:**
  - Patch
  - Chewing-gum
  - Nasal spray
  - Lozenge
  - Sublingual tablet
- **Effectiveness**
  - Doubling cessation rate compared to placebo



# *Bupropion*

- **“Anomalous” antidepressant**
- **Bupropion pharmaceutical forms available:**
  - Immediate release and SR tablets
- **Effectiveness**
  - As effective as NRT
- **Concomitant use of nicotine patch and bupropion SR tablets superior to single treatment**



## ***Aim of the work***

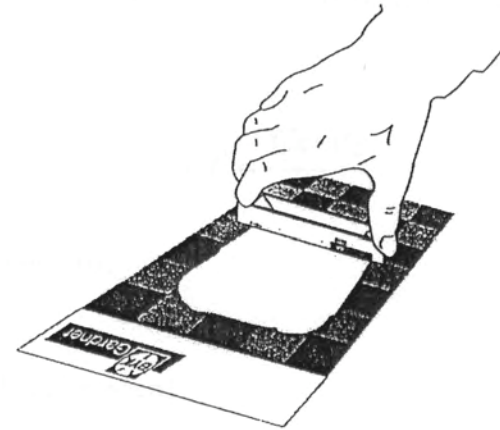
- **To realize a transdermal delivery system able to deliver nicotine and bupropion across the skin**

## **Objectives**

- **Characterization of permeation parameters of both drugs alone and in combination**
- **Excipient selection/compatibility**
- **Permeation from TDS**

# Materials&Methods

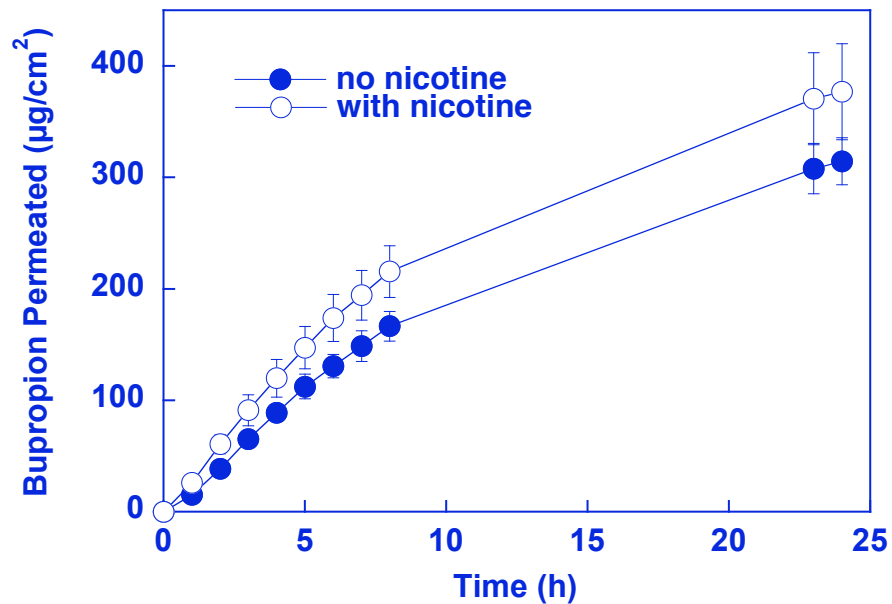
- Formulations:
  - pH 7.4 solution
  - Drug-in-adhesive (DIA)
    - Durotak® 387-2287
    - Bupropion base
  - Patch-non-Patch (PnP)
    - Poly vinyl alcohol
    - Poly vinyl pyrrolidone
    - Bupropion hydrochloride
- Barrier: rabbit ear skin



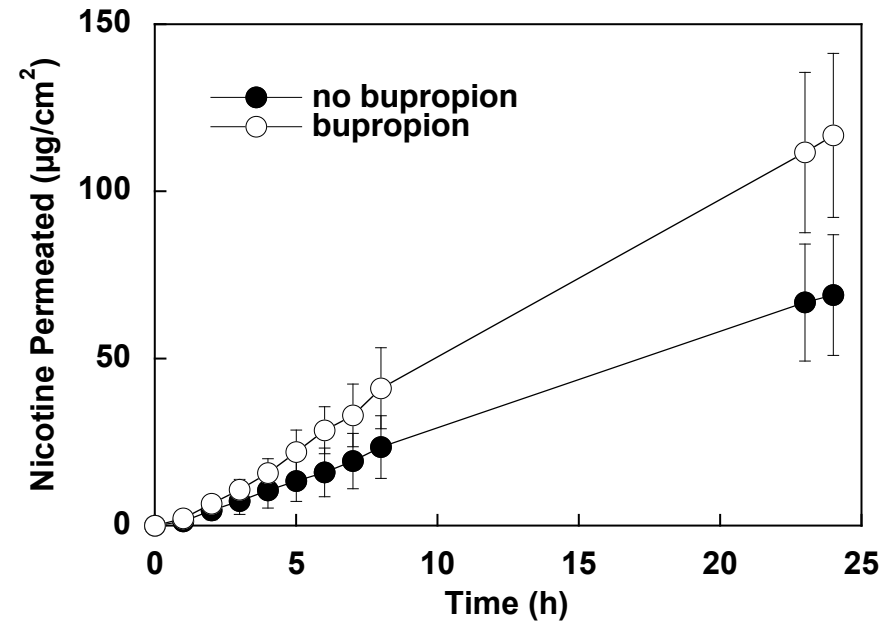
# Permeation from Solutions

- Permeability coefficients at pH 7.4:

Bupropion:  $3 \cdot 10^{-2}$  cm/h

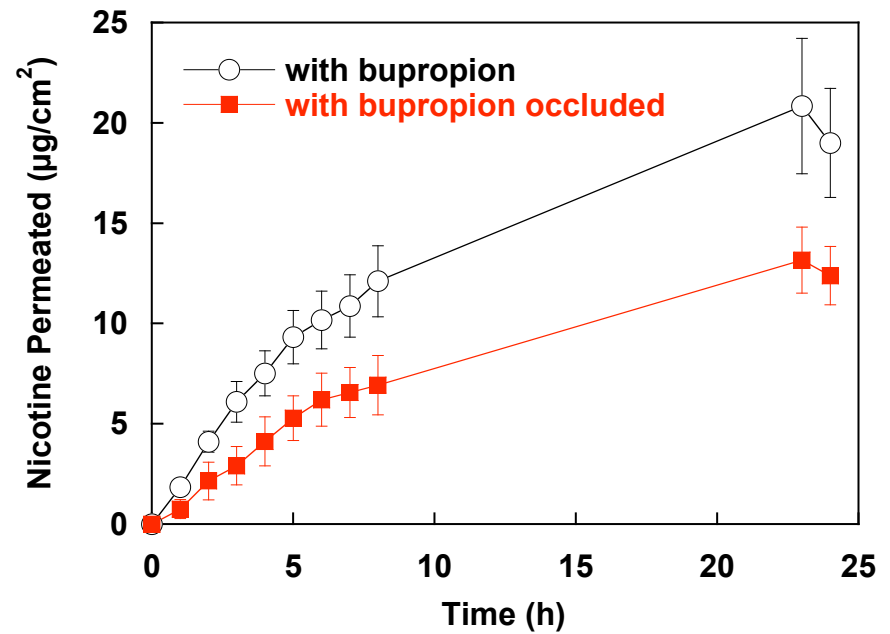
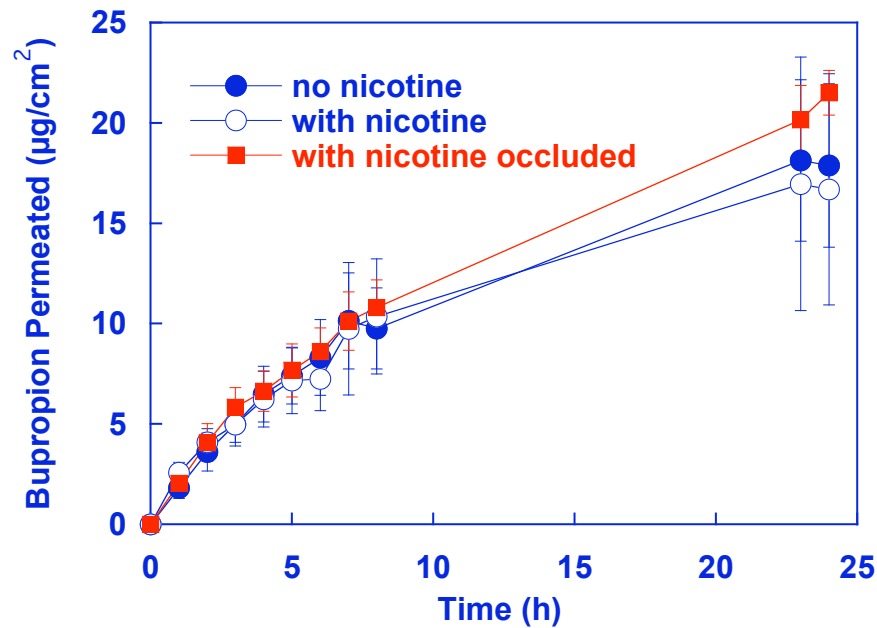


Nicotine:  $3 \cdot 10^{-3}$  cm/h



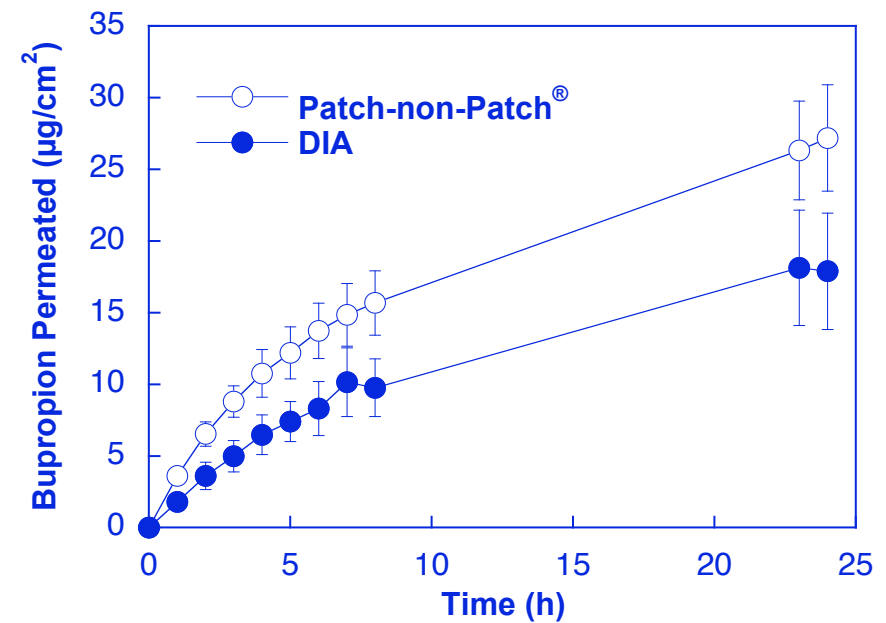
# Drug-in-Adhesive

- Effect of occlusive backing



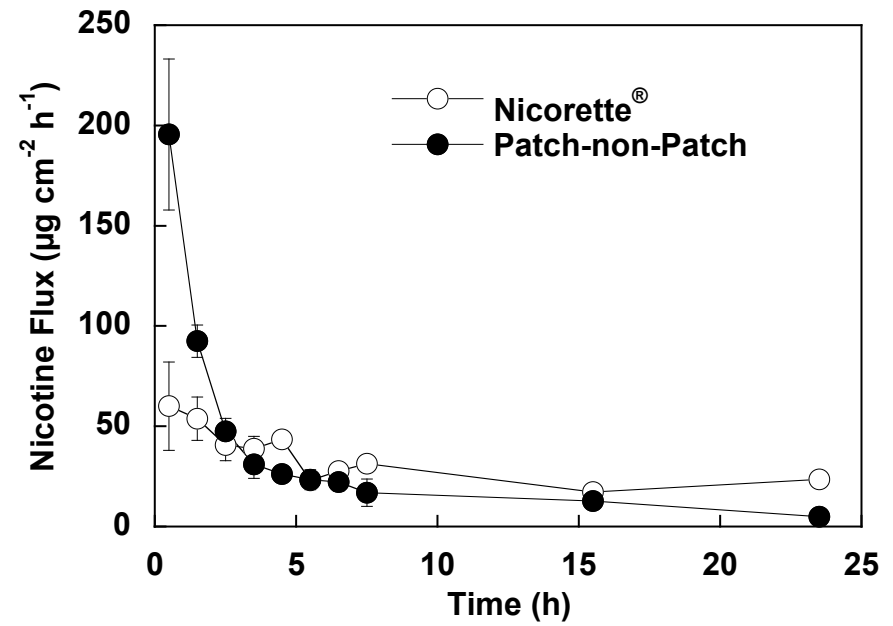
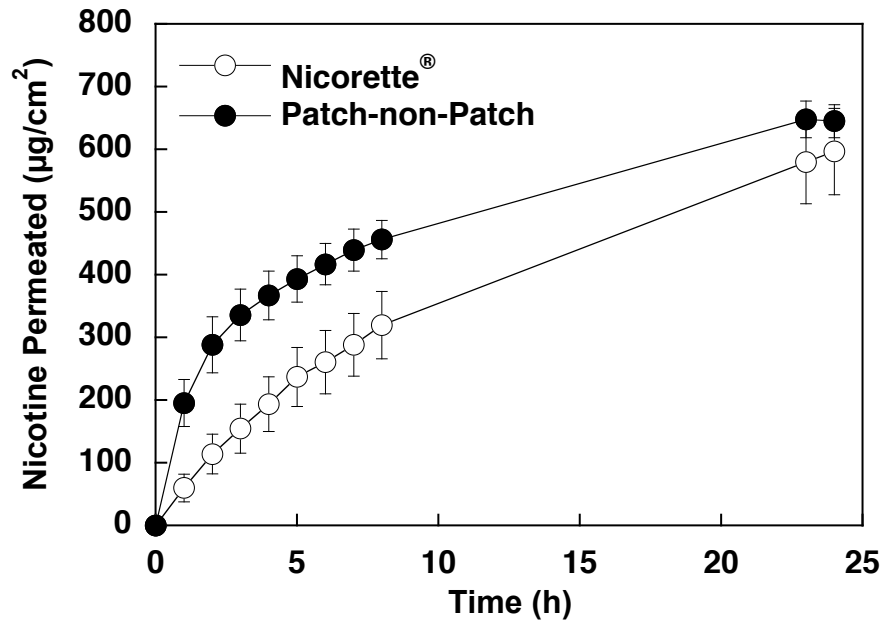
# Patch-non-Patch<sup>®</sup>

- **Dry**
- **Not self-adhesive**
- **Flexible, transparent**
- **Water permeable**





# Comparison with Commercial Patch



# ***Conclusions***

- **Bupropion and nicotine showed good permeation characteristics**
- **The combination of the two substances did not modify their flux**
- **Bupropion:**
  - **Flux lower than required**
- **Nicotine:**
  - **Profile comparable to commercial patch Nicorette®**
  - **High flux in the early times (PnP)**