

# **Dystonia in PD:**

**-- unwanted spasms**

**Joel S. Perlmutter**

**Elliot Stein Family Professor of Neurology,  
Radiology, Neuroscience, Physical Therapy  
& Occupational Therapy**

**Washington University in St. Louis**

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**Speaker's Bureau:** none

**Equity & Consulting Agreements:** none

# Outline of Talk

- **What is dystonia?**
- **Relationship to early PD**
- **Response to PD treatment**
- **How to treat dystonia in PD**

# **DYSTONIA**

- **A syndrome of sustained or intermittent muscle contractions causing abnormal movements, postures or both.**

**Albanese A et al, Mov Disord 2013**

# Cranial Dystonia

**mean age onset: 52**

**72 % female**

**Weiss E et al, Mov Disord 2006**

# Lower facial dystonia

# **Cervical dystonia**

**75% female; mean age onset: 45**

**60% with tremor**

**Sensory Trick**

**Weiss E et al, Mov Disord 2006; Norris SA et al Mov Dis 2016**

# Hand dystonia

**Mean age onset: 40; 55%  
female**

**Weiss E et al, Mov Disord 2006**



# Dystonia: gait

15194, age onset: 8

**Dystonia: legs → swimming**

**15194, age onset: 8, not DYT1**

# Dystonia in PD

- **Early manifestation of PD**
- **Related to medication**

# PD: Limb posture

**PD: flexed neck**

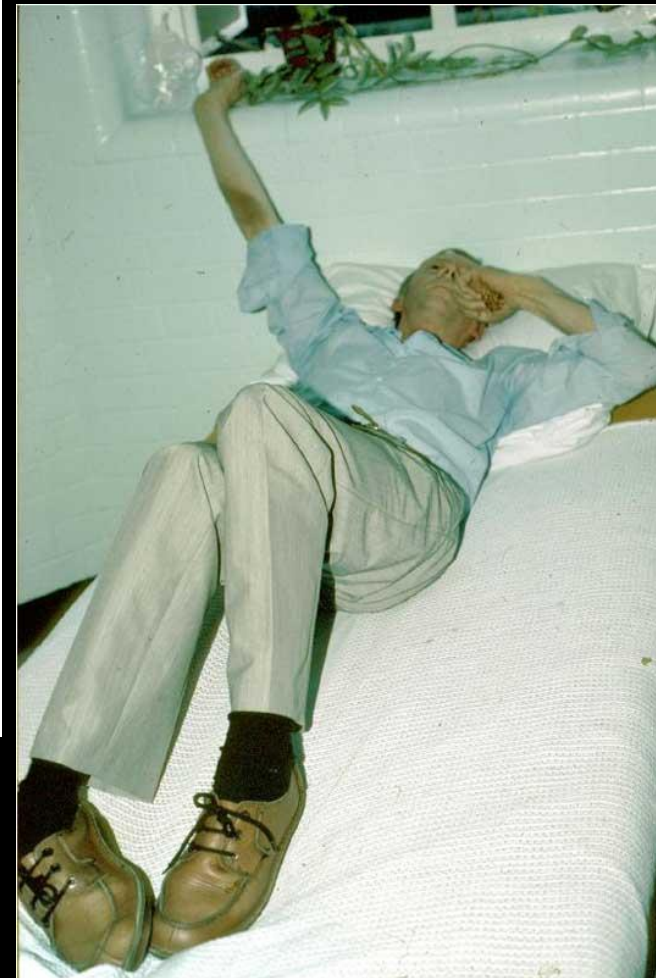
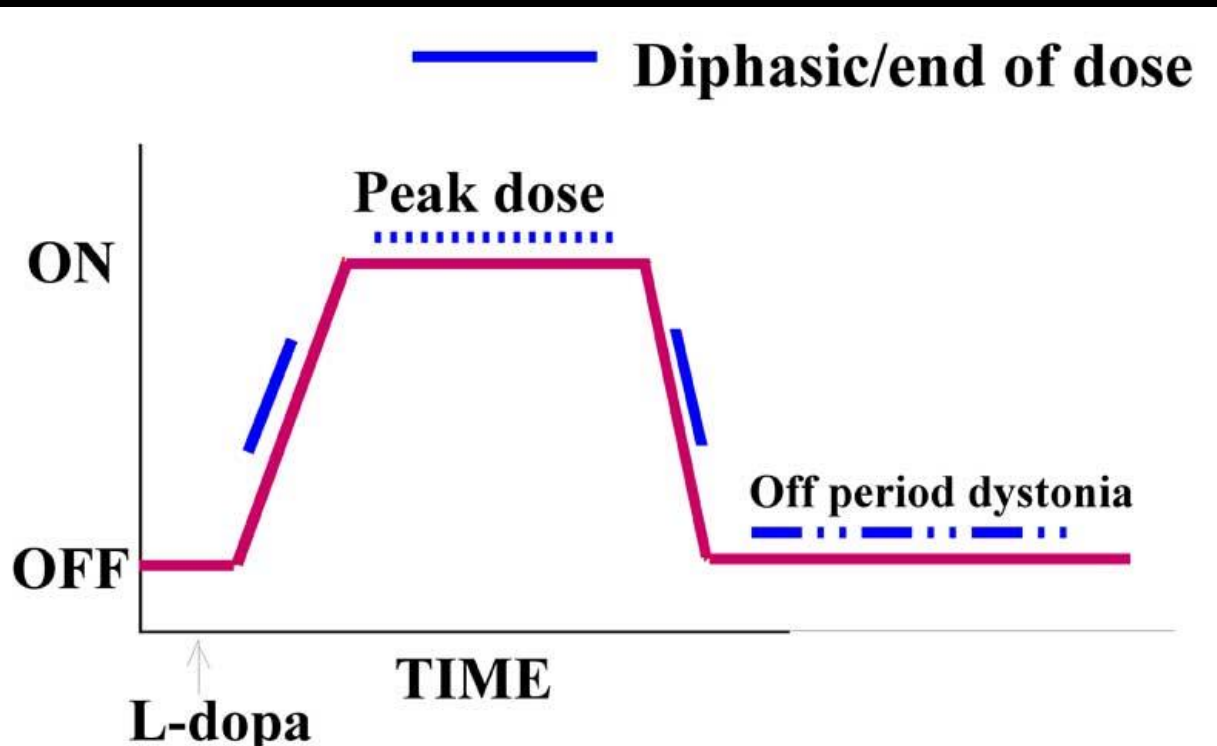
# PD: foot dystonia

# Genetics

- **Dystonia more likely in young onset PD**
- **More likely in early onset genetic PD**  
**parkin: autosomal recessive, juvenile onset, chromosome 6**

**Lucking CV et al, Lancet, 1998**

# Drug responses in PD: dystonia



**OFF period dystonia**

**diphasic**



# **Dystonia: Medication Effects**

**Dystonia**

**Dyskinesia**

**Off meds**

**On meds**

# **Dystonia: Medication Effects**

**Peak dose: Blepharospasm**

**Off meds**

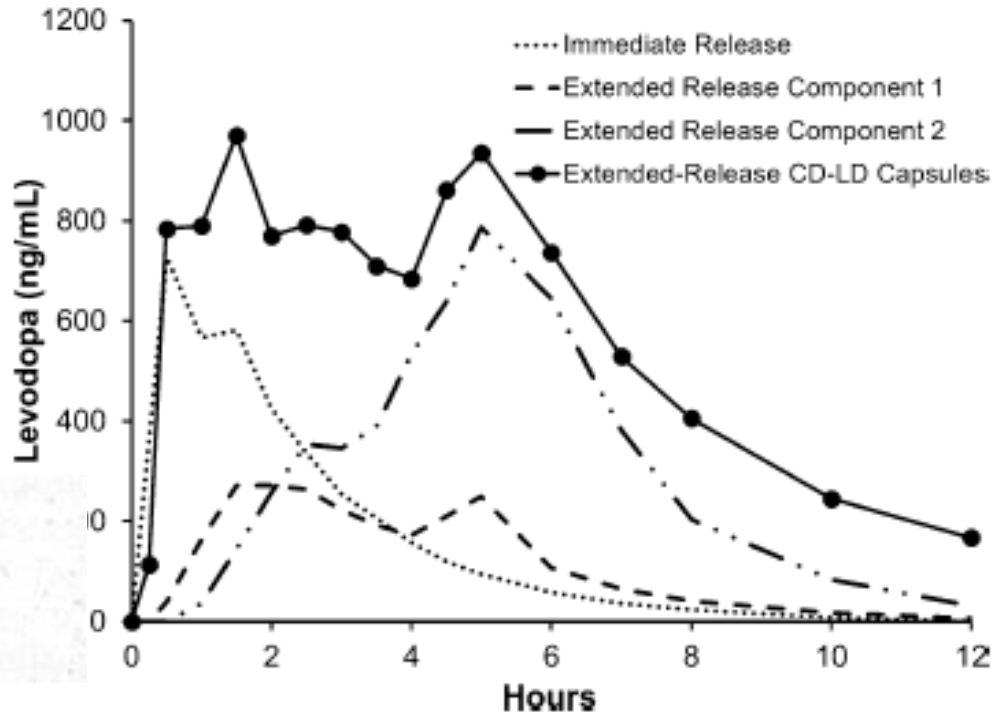
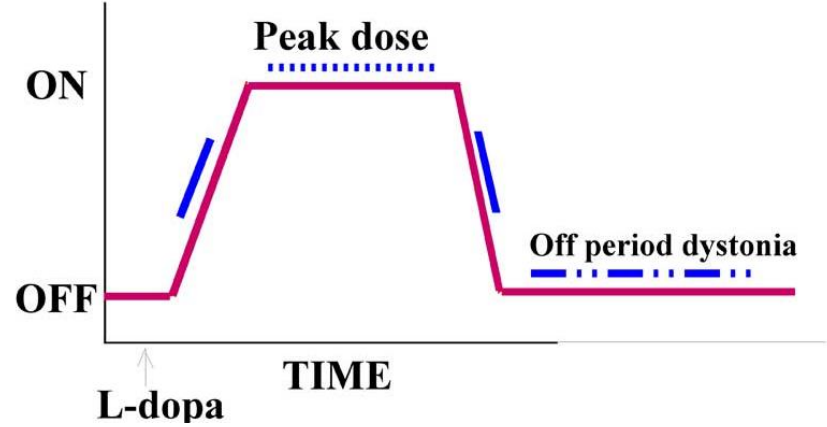
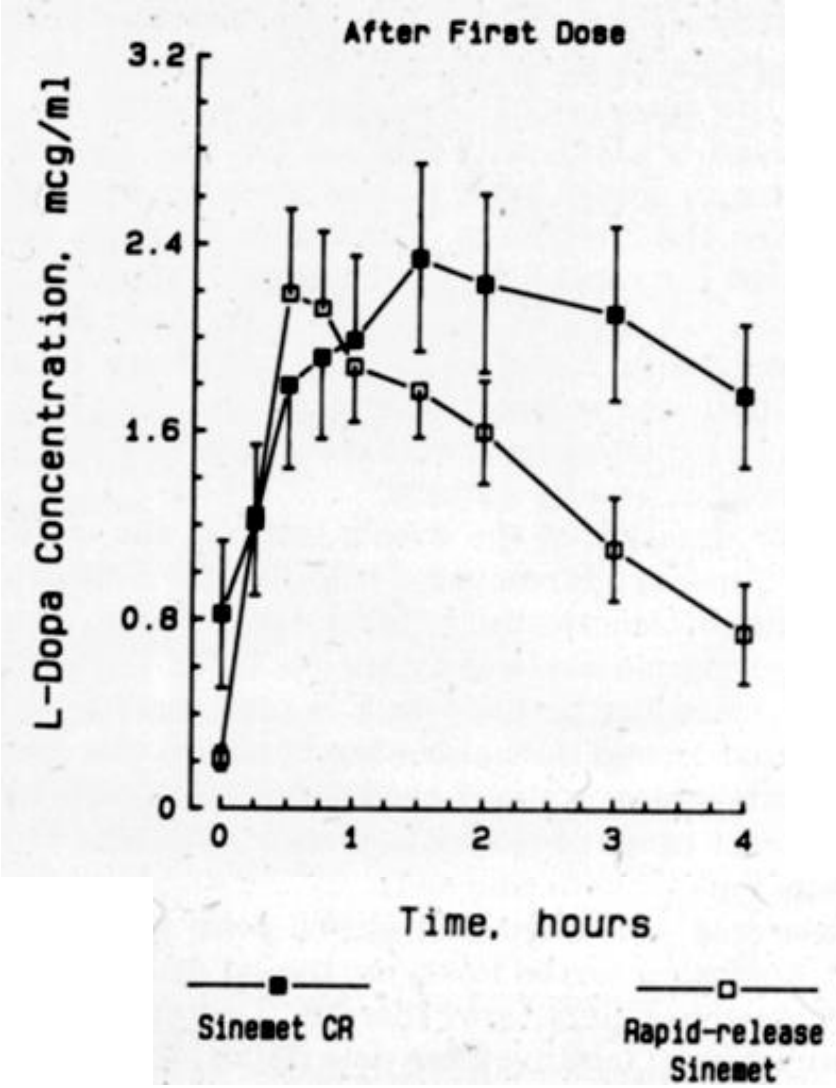
**On meds**

# **Dystonia: Medication Effects**

**End of Dose dystonia: feet**

**PD: OFF dystonia - hand**

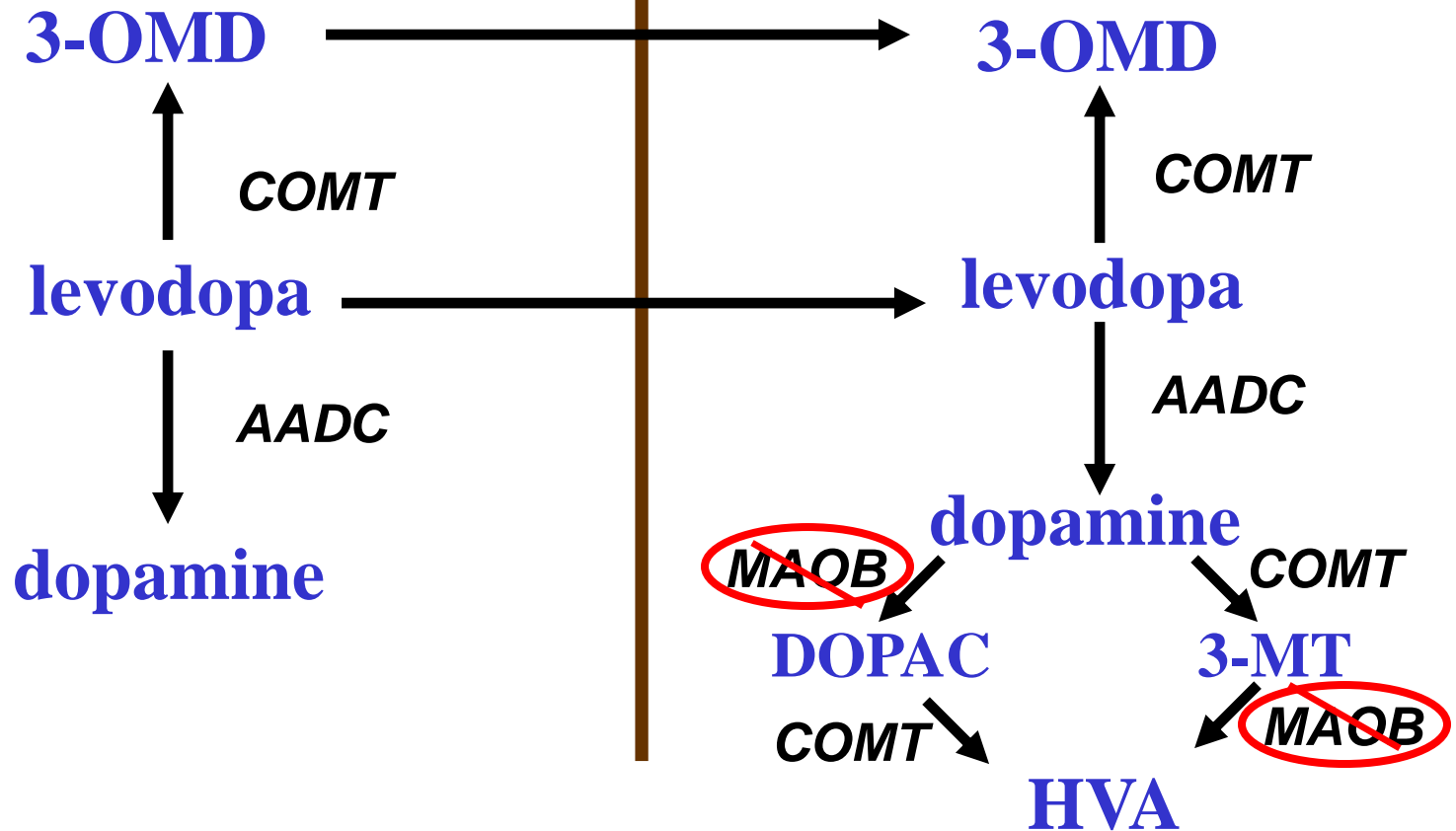
# Controlled release levodopa & Rytary



# MAOB Inhibition: Selegiline, Rasagiline, Saffinamide

Periphery

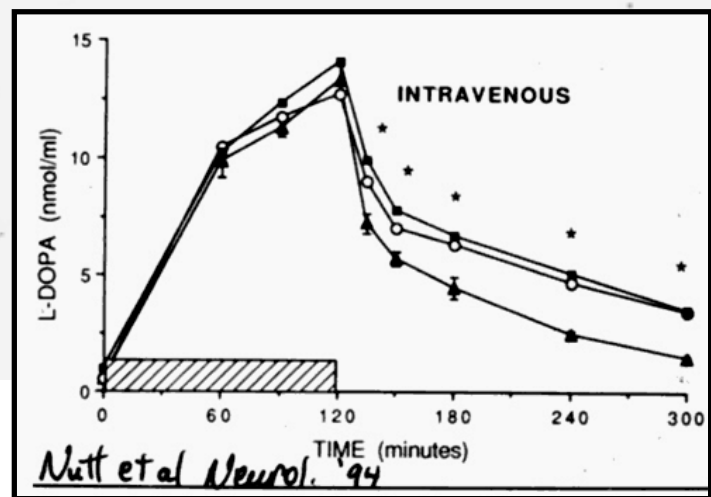
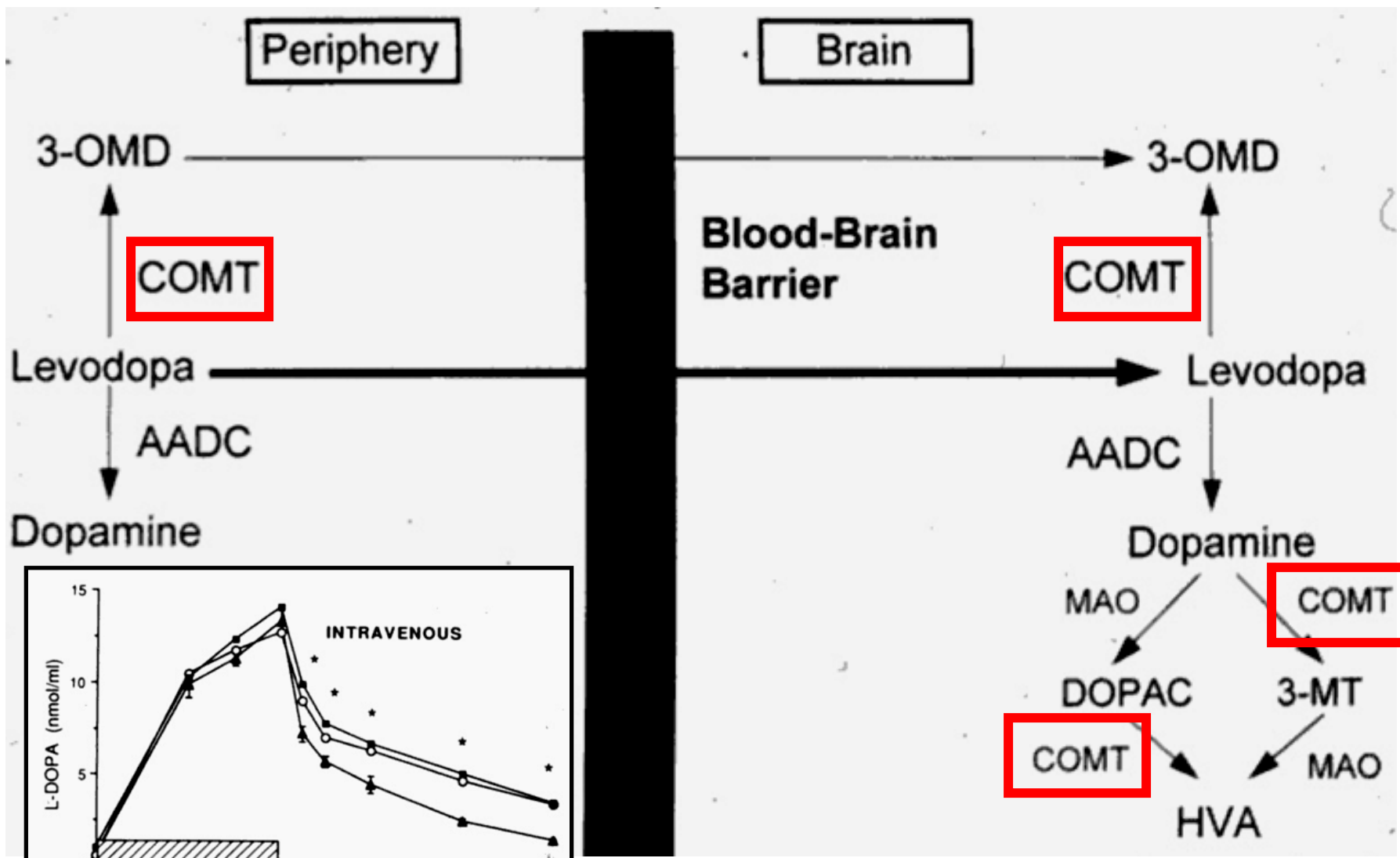
Brain



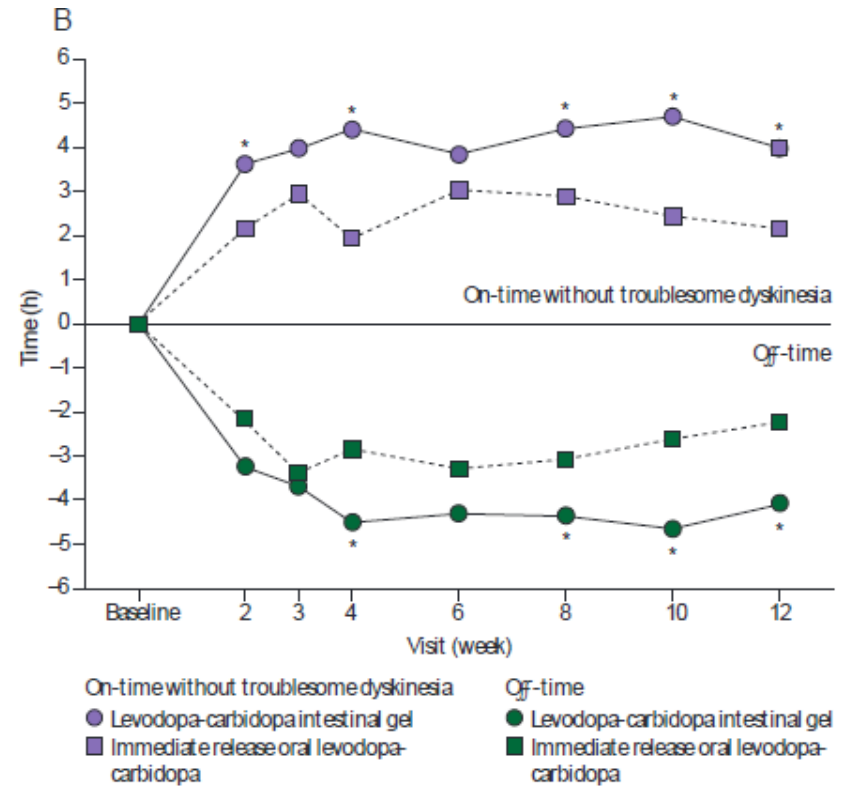
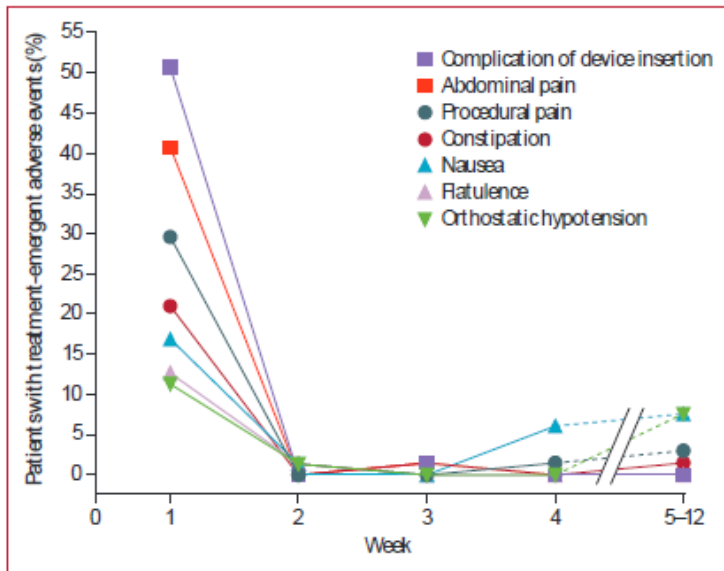
Blood-brain barrier

# COMT

# Inhibition: entacapone, tolcapone



# Levodopa Gel via PEG



Olanow et al, 2013

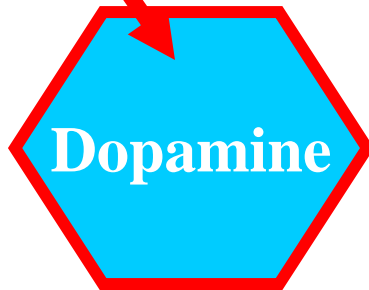
Abbruzzese et al, 2012



**Neuron**

**Synapse**

**L-dopa → dopamine**



**Presynaptic neuron**



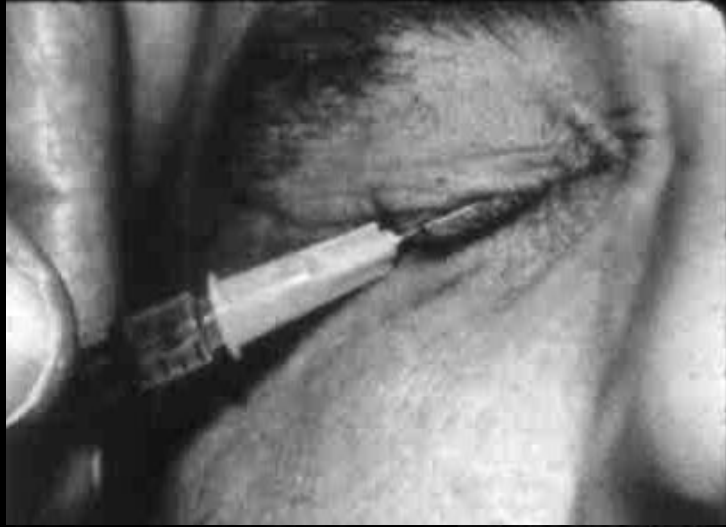
**Postsynaptic neuron**

# Dopamine Agonists

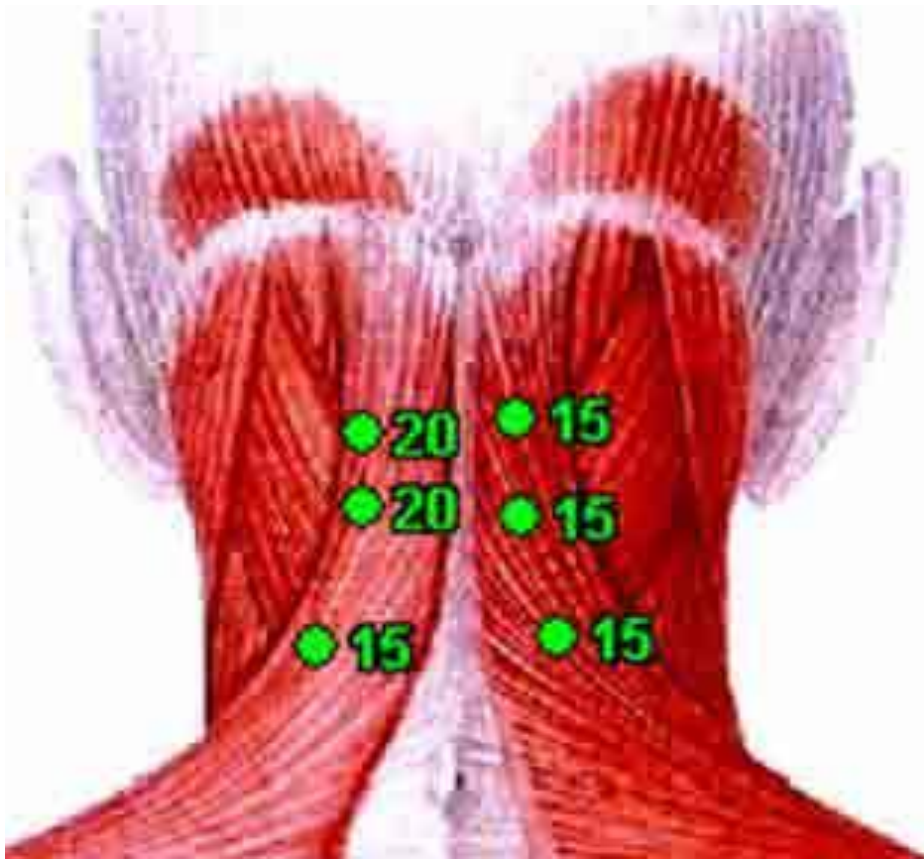
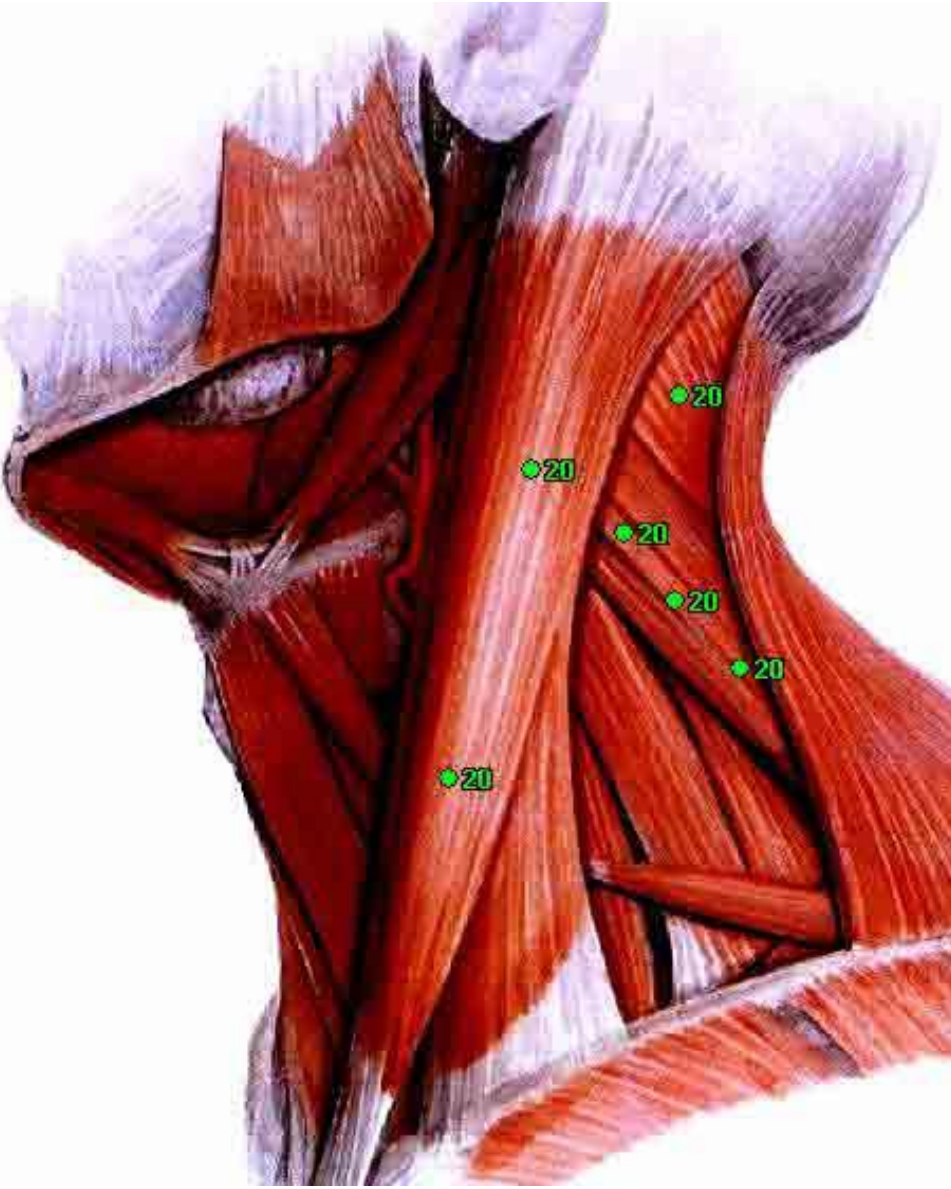
- Orthostasis
- Psychosis
- Compulsive behaviors
- Daytime sleepiness
- daytime somnolence/  
insomnia
- GI upset

- **Bromocriptine**
- **Pramipexole**
- **Ropinirole**
- **Rotigotine**
  - Transcutaneous administration
- **Apomorphine**
  - Rapid action
  - Injection
  - Nausea & vomiting

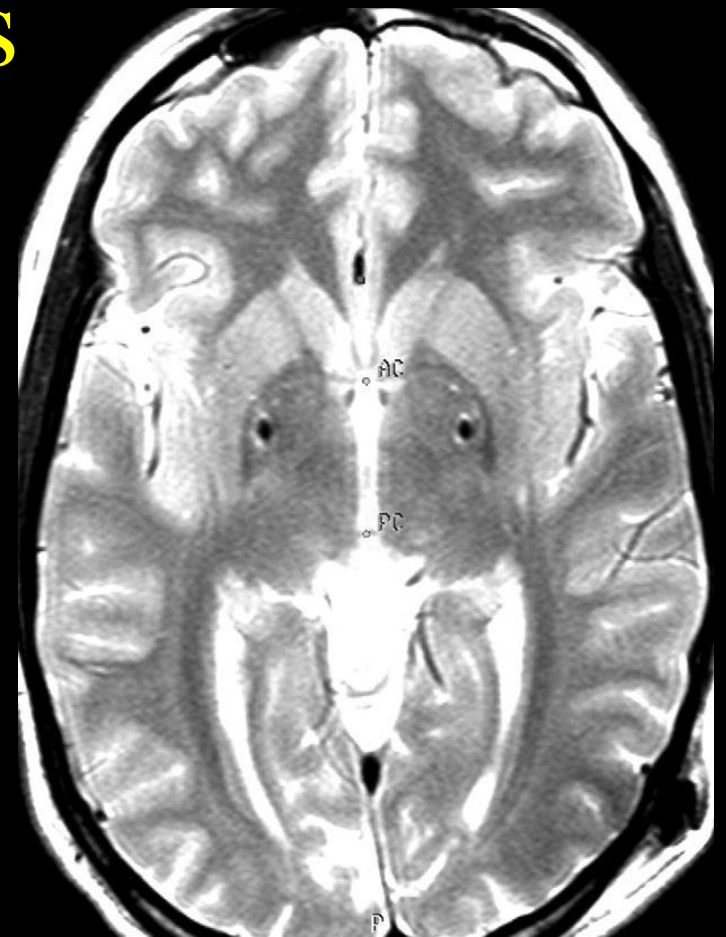
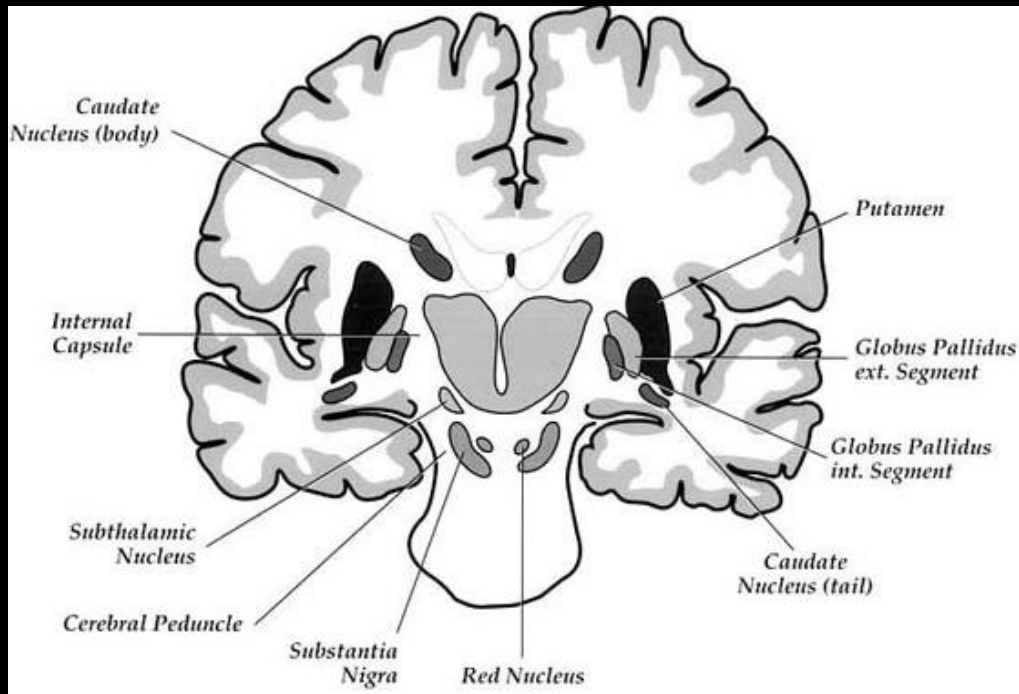
# Botulinum toxin injections



# Botulinum treatment of Cervical Dystonia



# Deep Brain Stimulation Targets



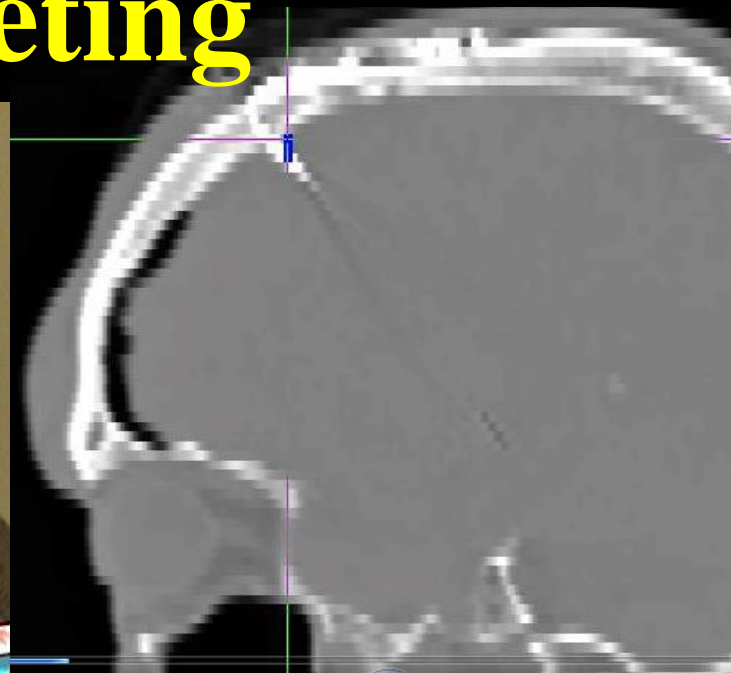
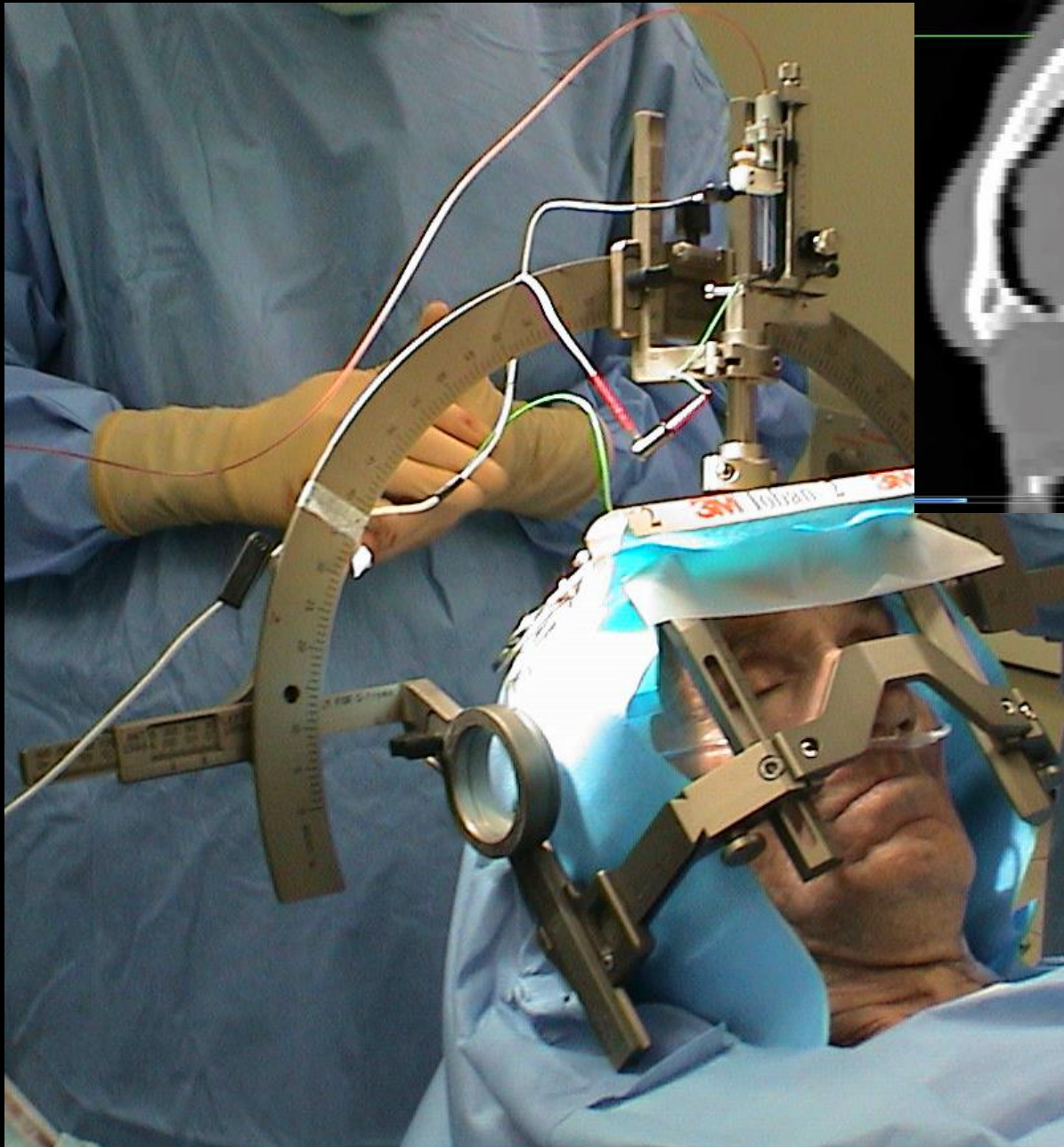
<https://youtu.be/kAIMTW0iP4w>

Ostrem & Starr, J Am Soc Exp Neurother, 2008

**Pallidal DBS  
for dystonia**



# Microelectrode targeting



# Effects of DBS

**Pre-Op: off    Post-Op: off    Post-Op: on**

# Collaborators

**Kevin Black**

**Meghan Campbell**

**Susan Criswell**

**Gammon Earhart**

**Erin Foster**

**Tamara Hershey**

**Jonathan Mink**

**Scott Norris**

**Brad Racette**

**Samer Tabbal**

**Mwiza Ushe**

**Nigel Cairns**

**Rick Perrin**

**LinLin Tian**

**Tom Videen**

**Allison Willis**

**Josh Dowling**

**Keith Rich**

**Chris Brown**

**Hugh Flores**

**Johanna Hartlein**

**Susan Loftin**

**Dawn Lintzenich**

**Jill Smith**

**Angie Wernle**

**Darryl Craig**

**Emily Williams**