

# Basic Science of Botox

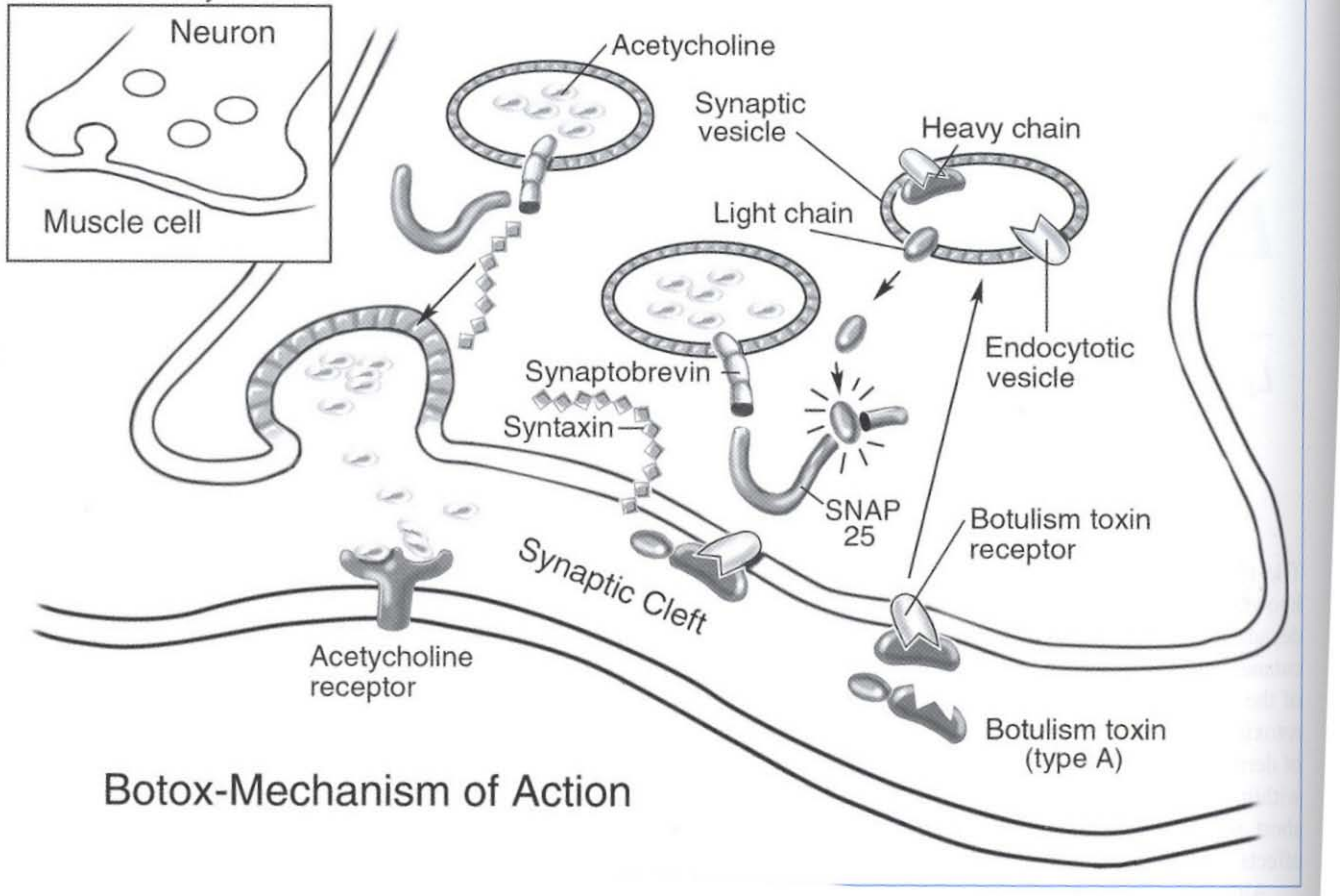
# Background

- 8 distinct subtypes of botulinum neurotoxin
  - A, B, C, alpha, C beta, D, E, F, and G
- botox induces chemical denervation of striated muscle by cleaving proteins required for release of acetylcholine
- results in temporary flaccid paralysis of the injected muscles for 3-5 months

# Basic Science of Botox

- Botox type A (BOTOX) is most common type used
- it cleaves the SNAP-25 protein (a component of the SNARE complex)
- an intact SNARE complex is necessary for release of Ach
- Botox B (Myobloc) cleaves synaptobrevin, another component of SNARE

Neuromuscular junction



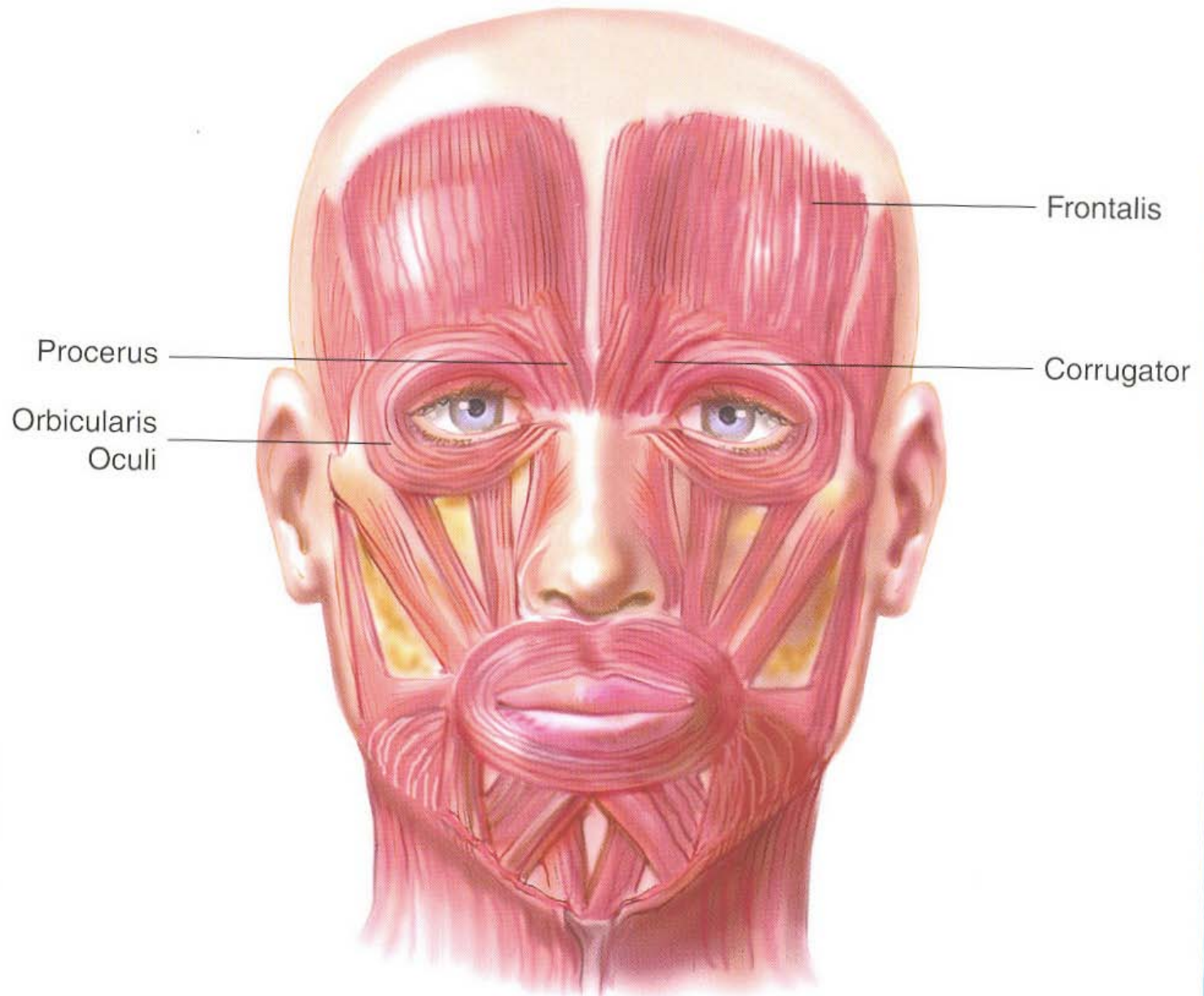
Botox-Mechanism of Action

# Clinical Indications

- Prevention and amelioration of dynamic wrinkles (“wrinkles in motion”) and cessation of hyperhidrosis
- Not useful for static wrinkles (“wrinkles at rest”)

# Storage and Handling

- One vial of BOTOX contains 100 units of vacuum dried type A toxin, human albumin, and sodium chloride
- reconstitution procedures vary, but recommended is:
  - 2.5 mL of 0.9% saline per vial
  - results in 4.0 units per 0.1 mL
- use by 48 hrs to up to 6 weeks, keep refrigerated



# Glabellar Frown Lines

- Muscles involved include frontalis, procerus, corrugator supercilli, and medial fibers of orbicularis oculi
- contraction results in elevation of the brow and wrinkles of the forehead
- corrugator contraction results in adduction of the eyebrow inferiorly and medially



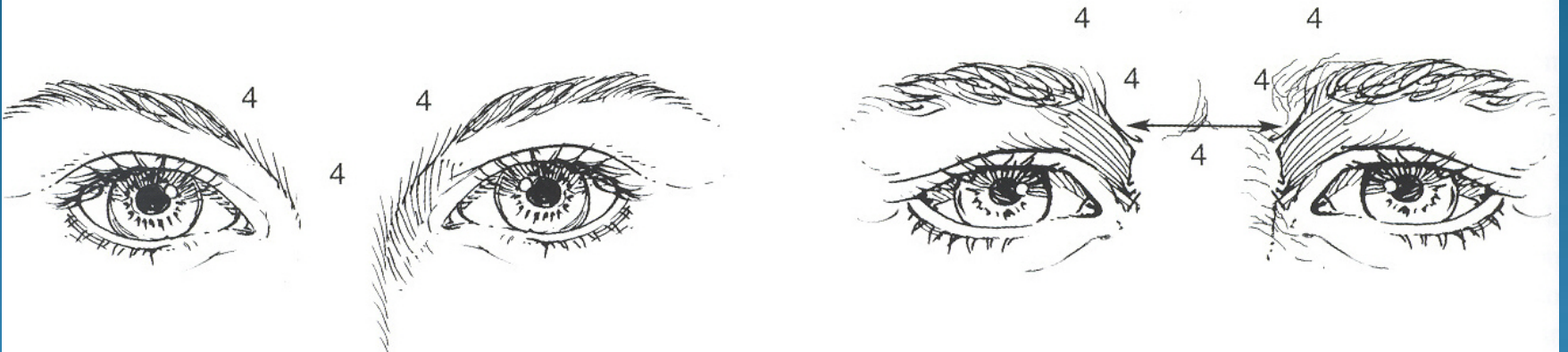


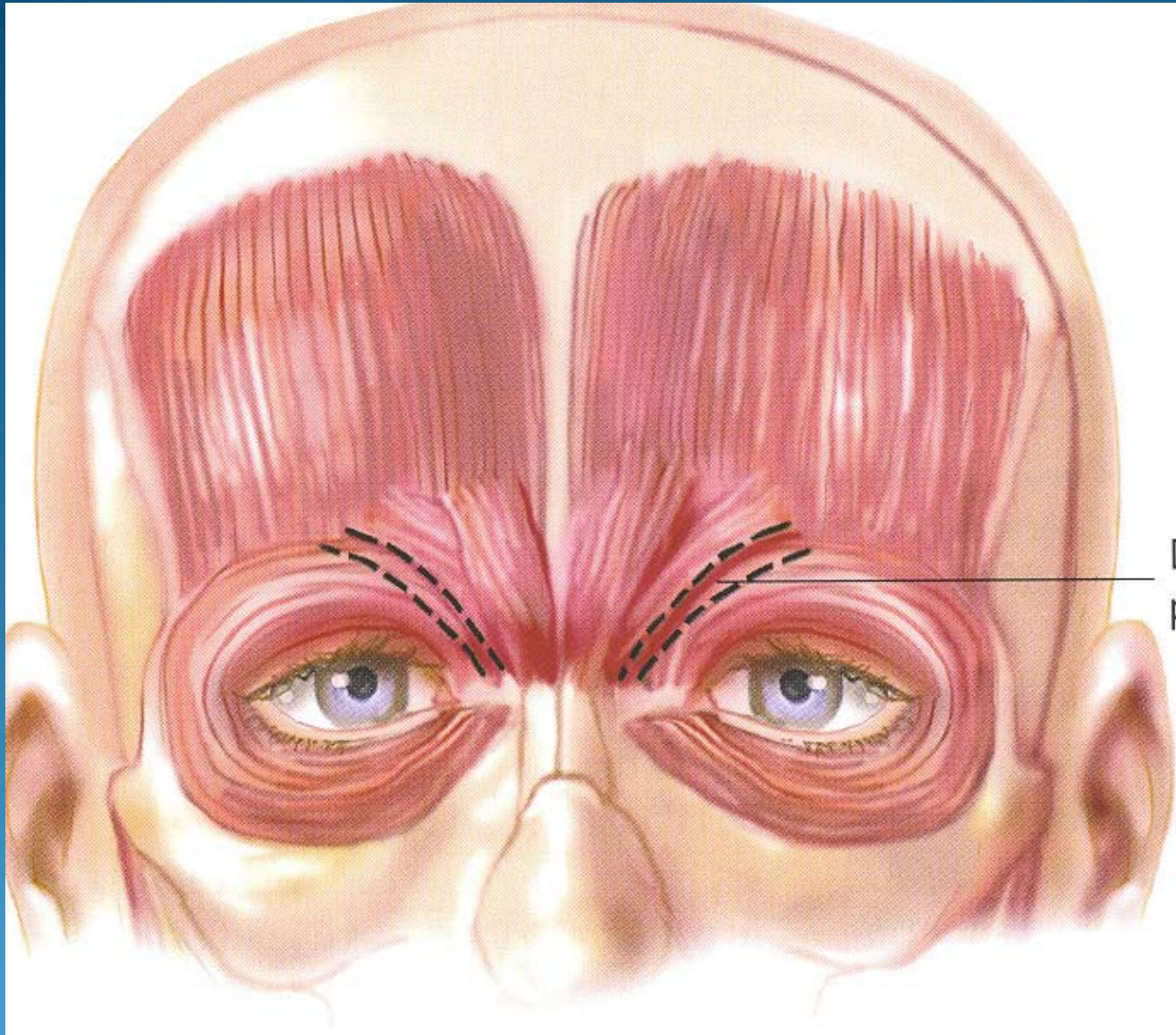
# Glabellar region

- Inject 4 units (0.1cc) into each corrugator and the procerus muscle (**IM injections**)
- avoid hitting the periosteum
- after injection of the procerus, massage laterally to ensure diffusion into the depressor supercillii portion of the corrugator

Female

Male





Depressor supercilli  
portion of the corrugator

# Side Effects of Treating the Glabellar Region

- Blepharoptosis- occurs when toxin diffuses into upper eyelid levator muscle

# Avoiding Side Effects

- Patient should remain vertical for 2-3 hours postop
- encourage patient to frown frequently, but not manipulate the area
- avoid injection of the levator palpebrae superioris muscle
- corrugator injection should be at least 1 cm above supraorbital ridge
- do not inject closer than 1 cm above the central brow

# Post Procedure Care

- Patients should remain vertical for 2-4 hours
- avoidance of touching or rubbing of the treated sites for 24 hours
- results take 12-96 hours to appear
- optimal effect develops within 7 days
- effectiveness declines after 3-4 months

# Contraindications to Botox

- Presence of neuromuscular disorders such as myasthenia gravis or ALS
- Pregnant or lactating women
- Patients taking aminoglycosides, penicillamine, quinine, or CCB's
- Evidence of active infection at injection site



# General Complications

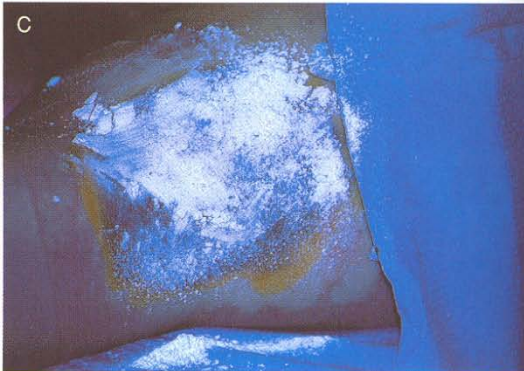
- Bruising (esp. in patients taking ASA or Vitamin E)
- acute Type I allergic reactions
- nausea, headache, fatigue, malaise, flu-like symptoms, and rashes at sites distant from injection have all been reported

# Hyperhidrosis

- Can treat axillary, palmar, and plantar areas
- reconstitute one 100 unit vial with 5 cc NS
  - 2 units per 0.1 cc
- injections are intradermally (vs. IM for facial lines)
- nerve blocks are needed for anesthesia
- inject 0.05 cc at 1.5 cm intervals

# Hyperhidrosis

- Perform Minor's starch-iodine test
  - iodine solution (9 parts iodine with 1 part castor oil) applied to affected area
  - cover with starch powder
  - areas producing sweat will turn blue-black
  - provides map for injection sites



# Hyperhidrosis

- 100 Botox units (5 cc) needed per palm or sole
- 50 Botox units needed per axilla
- effects last approx. 4 months
- side effects:
  - hematomas
  - transient weakness of hand muscles