Purpose

- To introduce the concept of compounding pharmacy and its utility for patients suffering from neuropathy
- To explain some of the therapies involved in neuropathy treatments
- Develop a relationship that you can utilize to have questions answered and problems solved!!!
Definition

- **What is a COMPOUNDING pharmacy?**

  - A Compounding Pharmacy is a full service pharmacy that specializes in creating custom medications based on the specific needs of its patients.

  - We make medications from scratch! Starting with bulk active powders we prepare the medication depending on what our patients may need (ex. capsule, creams, etc).

Compounding triad

Consists of a direct relationship between the Patient, the Doctor, and the Pharmacy
History

- In the beginning...
  - Pharmacy was all compounding!
- Off to war!!
  - Because of WWII pharmaceutical companies were developed
- Present day compounding...

Current events

- Compounding pharmacies have had some negative publicity in the past in an effort to make some patients skeptical.
- This was primarily due to pressure from large pharmaceutical companies in an effort to limit their competition.
- Result?
<table>
<thead>
<tr>
<th>Reasons to compound</th>
<th>Who do we serve?</th>
</tr>
</thead>
<tbody>
<tr>
<td>To change a medication’s flavor</td>
<td>Natural Hormones (aka Bio-Identical)</td>
</tr>
<tr>
<td>To combine multiple medications</td>
<td>Pediatrics</td>
</tr>
<tr>
<td>To alter the dosage form (capsule to cream, etc)</td>
<td>Veterinary</td>
</tr>
<tr>
<td>To remove an ingredient (allergy or intolerance)</td>
<td>Pain Management</td>
</tr>
<tr>
<td>To provide a discontinued medication</td>
<td>Dermatology</td>
</tr>
<tr>
<td><strong>TO SOLVE A PATIENT’S PROBLEM...</strong></td>
<td>and many more...</td>
</tr>
</tbody>
</table>
Dosage forms

- Capsules
- Creams/Ointments
- Injections
- Suppositories
- Troches
- Lollipops
- Oral solutions/suspensions

How Do we Do it?

- All compounds start with a prescription from a physician
- The pharmacist will then write a formula based on what the physician has prescribed
- All the drugs are then weighed with an electronic balance that is accurate to the 0.001 measurement
- We combine all the ingredients in a mortar and mix with a pestle
- We then incorporate our desired base and again mix well and/or run through an ointment mill if necessary
- We transfer our product to the desired dosage form
What about Neuropathy?

- Oral medications vs. Transdermal delivery (TD)
  - Goal of therapy with both is to reduce the neuropathy symptoms while minimizing the medication’s side-effects

ORAL THERAPIES

- Benefits:
  - Easy to use
  - Easy to travel with
  - Comfort level
  - Gold Standard

- Include medications like Neurontin, and Lyrica to name a few
  - Have side-effects that many patients do not tolerate very well (dizziness, falling spells, and weight gain).
  - Not the primary focus of this presentation
Transdermal goals

- Through transdermal therapy we try to combine several different drugs and therefore utilize various mechanisms of action to treat the problem.

- This approach creates synergy and allows us to use the smallest possible dose necessary.

- We attack the way a well trained neurosurgeon attacking...
**TD benefits**

- Benefits of Transdermal Therapy include:
  - no oral or GI side-effects
  - quick onset of action
  - no drowsiness
  - can apply right where the pain occurs
  - the medications used are adjustable
  - no drug interactions

**Lipoderm**

- We use a base called Lipoderm to accomplish TD delivery.
- Developed from the PLO (Pluronic Lecithin Organogel) base which is a two-phase system.
Application

- Application is simple!

  - The cream will be dispensed in an special container called an EMP jar. There will be a hole in the top of the container and a button on the bottom. Simply push on the button and the cream will come out on the top.

  - You will use a small “pea-sized” amount on the skin and spread it out as needed to cover the entire surface. It may be necessary to use the “patch work quilt” approach if it is a large area.

  - Once on the skin, gently massage the cream until it completely disappears.

What to expect
Storage

- Transdermal medications should be stored at room temperature
- Don’t leave them in your car
- Keep them out of reach of children
- Not to be used orally

Side effects

- Side-effects are generally limited to direct application to the skin.
- Some people with very sensitive skin may notice a slight burning or tingling upon application the first couple of days but this will go away with time.
- This is normal and does not indicate a medication error.
Some Common Drugs
For Transdermal Neuropathy Treatment

- Some of the most common drugs used are:
  - Ketamine (5-10%)
  - Ketoprofen (20%)
  - Clonidine (0.2%)
  - Gabapentin (6%)
  - Baclofen (5%)
  - Nifedipine (2%)
  - Amitriptylline (2%)
  - Nif

ketamine

- Non-competitive NMDA antagonist

- Known for blocking Morphine tolerance

- A 1998 study showed that a peripheral nerve insult induces NMDA receptor-mediated, delayed degeneration in spinal neurons.

- Study results showed that intervention with Ketamine can block the glutamate shower of the NMDA receptor, therefore preventing the Calcium intracellular cascade of events that result in long-term potentiation and/or cell death.
Ketoprofen

- Non-Steroidal Anti-Inflammatory
- decreases the inflammation associated with injury
- decrease pain associated with injury

Clonidine

- alpha-2 agonist
- blocks NE release from SNS endings
  - potentiates the effects of anesthetics and opiates
  - also has mu agonist activity

Gabapentin

- Glutamate antagonist
- AMPA (sodium channel) antagonist
- decreases NMDA activity

Baclofen

- Muscle relaxant GABA-b agonist
- possesses pre-synaptic depressing action at NMDA and non-NMDA receptors
- thought to have inhibitory action on pain signals
Nifedipine
- non-NMDA Calcium channel blocker
- blocks the calcium intracellular cascade of events resulting in apoptosis (programmed cell death)

Amitriptylline
- NE reuptake inhibitor
- has been shown to have neurotrophic activity
  - Neurotrophic factors are secreted by target tissue and act by preventing the associated neuron from initiating apoptosis (programmed cell death) - thus allowing the neurons to survive.

Common dosing Guidelines
- The theory of low-dose, multiple, complimentary therapy starts with 3 drugs incorporated into the Lipoderm base.
- Normally applied at 8 hr intervals on a regular basis.
- Dose escalation can occur daily or every other day until pain is relieved.
- Additional medications can be added if another MOA is needed within 2 weeks.
- Ketamine 10%, Gabapentin 6%, Clonidine 0.2% # 60 gms

- To be applied to affected area 2 - 3 times a day

- Can add additional drugs as needed once pain is assessed in 7-14 days

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What about the cost?

- TD therapy can become a bit expensive as multiple drugs are involved.

- Average beginning prescription is around $65 for a 3 drug regimen and usually increases in price by about $15 per drug after that.

- Price may vary based on use and arrangement with insurance company

- We will provide an already completed insurance form for you to send in for reimbursement
Who we are...

family owned

and operated
Our staff

if we can’t make it...you probably don’t need it

2 locations to serve you

- Medical Center
- 6603 Kirby Drive (near Kirby and Holcombe)
- Sugar Land
- 4760 Sweetwater Blvd, ste 103 (behind Starbucks)