How to read this chart:

Neurotransmitters are in bold.

Drugs are inside a little black box.

Different neurotransmitters are separated by a thicker black line.

This is roughly organized as a spectrum - things on the far left make you hungry, things just left of center tend to relieve nausea, things just right of center make you not hungry, and things on the far right make you nauseous. The ideal diet drug would thus be located purely in the "not hungry" region. Most diet drugs are somewhere between the "not hungry" and the "nauseous" regions, because it is hard to banish hunger without making people feel sick.

Example:

**Dopamine** is a neurotransmitter, because it is in bold. It makes people not hungry and nauseous, because the "dopamine" box spans those two categories. Apomorphine is a potent D2 dopamine receptor agonist, so it makes people nauseous, and has on occasion been used to induce vomiting. Amphetamines boost dopamine, but are not direct agonists, and thus amphetamines make people less hungry and on occasion nauseous, but amphetamines do not induce nausea nearly as much as apomorphine, and thus the amphetamine box does not span as far to the right. Antipsychotics are in the "dopamine" section because they act via dopamine D2 receptors, but antipsychotics are on the opposite side from dopamine itself. This is because antipsychotics are D2 antagonists, they block the effects of dopamine and thus cause opposite effects from dopamine, i.e. antipsychotics prevent nausea and increase appetite.

Two paradoxes:

Most drugs will be on one side or the other of this spectrum. Two drugs on this chart are paradoxical, though, and appear on both sides of the spectrum.

The first paradox is marijuana, which tends to increase appetite but also causes nausea and vomiting. Marijuana can induce vomiting quite reliably in certain circumstances and certain patients, and marijuana-induced vomiting can be quite severe, often requiring hospitalization and administration of antinausea drugs listed on this chart, and IV fluids. It could be said that marijuana is a cruel joke because it makes you hungry and nauseous.

The second paradoxical drug is amphetamine, which makes people not hungry but also relieves nausea. Amphetamine is especially effective at relieving motion sickness, which is good news for pilots and sailors.
<table>
<thead>
<tr>
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<th>Not nauseous</th>
<th>Not hungry</th>
<th>Nauseous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of food</td>
<td>Pepto-Bismol</td>
<td>A big meal</td>
<td><em>Big Bang Theory</em></td>
</tr>
</tbody>
</table>

### Dopamine (D2)
- **Antipsychotics**
  - Apomorphine
  - Eg. Haldol, Zyprexa
- **Metoclopramide**
  - Eg. methamphetamine, Ritalin, Adderall, phentermine

### Serotonin (5-HT3)
- **Atypical antipsychotics**
  - Chemotherapy
  - Eg. Zyprexa
- **Ondansetron**
  - Fenfluramine
  - MDMA
  - Fluoxetine, sibutramine
  - Mescaline
  - Ethanol

### Acetylcholine
- **Nicotine**
  - Anticholinergics
  - Cholinesterase inhibitors
  - Eg. Benadryl, Dramamine, Zyprexa, scopolamine
  - Eg. nerve gases, physostigmine
  - Varenicline (Chantix)

### Norepinephrine
- **Amphetamine**
- **Pseudoephedrine**
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**Opioids**
Eg. morphine, heroin

**Histamine**
Zyprexa, Benadryl, meclizine

**Cannabinoids**
Marijuana

**Rimonabant**

**Insulin**
Metformin

**Aprepitant**

**Testosterone**

**Progestrone**
Megestrol, Mifepristone (RU-486)

**Glucocorticoids**
Dexamethasone, Mifepristone (RU-486)