

Prednisone: Satan's Little Helper



By Josh Bloom — December 12, 2016



Prednisone- the Yin and Yang of Drugs

If you are one of the roughly 100% of Americans who despise the incessant TV boner drug ads, you should be thankful that you don't have to sit at dinner and listen to the side effects of *this* bad boy: Prednisone. (Cue: woman with nauseating voice.)

Its side effects make those of Cialis sound like rice pudding. And you don't even get a four-hour Woodrow out of the deal. But you can get [these](#) [1]:??????

confusion	mood changes	behavior changes	eye pain
infection	bone loss	swelling	weight gain
depression	extreme happiness	or sadness	bloody stools
pancreatitis	nausea	vomiting	extreme thirst
increased urination	high blood pressure	headache	buzzing in ears
insomnia	acne	sweating	dry skin
anxiety	seizure	coughing up blood	fast heart rate

Prednisone side effects. Lovely (1).

You'll note that I highlighted one of them. OK, two. because my mood changed because of the prednisone I'm now taking. This is because I am an asthmatic, and when things get bad, we asthmatics really need the stuff. The two side effects in bold bother (personally) me the most, which makes me rather fortunate. Many people get far worse. But, oral anti-inflammatory steroids like prednisone are your only choice when you need some serious anti-inflammatory action (2) going on. It sucks. But, so does not breathing.

The confusion side effect is particularly distressing for those of us who might happen to work in a job where you really can't afford to screw things up (Exception: Environmental Working

Group—that *is* their job).

Note the difference between a day on prednisone and a day without. It can be rather profound:

Non-Prednisone Day



None, boss

Hey Bloom! How many times did I ask you for that report today?



Well, you should have known anyhow!!! Idiot!
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On the other hand...

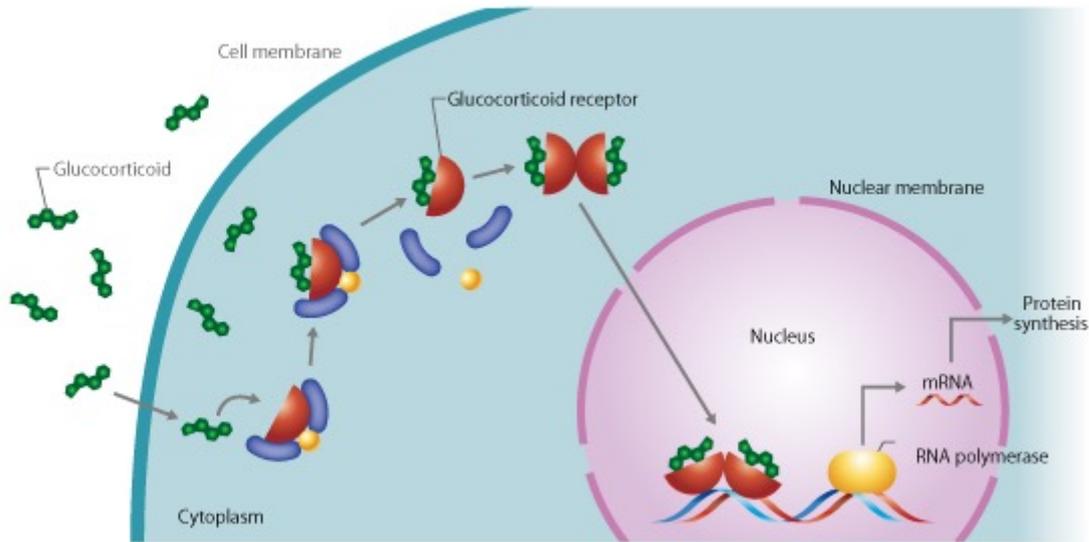
Prednisone Day



So, why is prednisone so effective, but also so dangerous? It is because the drug is non-selective. It does what it's supposed to, but also, plenty more (see below).

Prednisone is a member of a class of steroid hormones called glucocorticoids, which are released by the adrenal gland. Glucocorticoids pass through cell membranes (3) into the cytoplasm, where they bind to glucocorticoid receptors, forming a glucocorticoid-receptor complex. The complex then makes its way into the nucleus of the cell, binds to DNA and activates it. Now it's party time.

Glucocorticoid activation of DNA plays a part in regulation of multiple processes, such as glucose, fat, and protein metabolism. It also "instructs" the DNA to upregulate anti-inflammatory responses and downregulate pro-inflammatory responses (4). This is why it works.



Depiction of glucocorticoid mode of action. Image: University of Tokyo

Prednisone's many interactions with DNA, and the subsequent biochemical responses that are triggered, are the reason for all of the side effects. Prednisone is what we call a "dirty drug"—one that acts non-specifically. Dirty drugs elicit multiple responses both at the desired target, but also at any number of undesired targets in the body, thus the side effects.

This is why prednisone is so effective, but also so dangerous—especially for long-term use.

Breathe easy, folks. More or less.

Notes:

(1) Most of these effects result from long term use of the drug, however, the behavioral changes can happen very quickly, especially at high doses. One of them, [steroid \[2\] psychosis \[2\]](#), is something that should be rather high on your list of life experiences to avoid.

(2) Prednisone is also used to treat severe allergies, psoriasis, as an immune suppressant for organ recipients, and sometimes as an adjuvant to cancer chemotherapy. It is a lifesaving drug.

(3) Steroids are lipophilic (dissolve in fat). This is why they can pass so easily through cell membranes.

(4) This is highly oversimplified. There is a whole lot more going on. Not easy either.

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Links

[1] <https://www.drugs.com/prednisone.html>

[2] <http://www.the-rheumatologist.org/article/when-steroids-cause-psychosis/>