Week 5 Questions & Answers:

1. **Why is combination therapy of topical clindamycin and benzoyl peroxide aimed at preventing resistance to clindamycin?**
    - Benzoyl peroxide has antibacterial properties and helps reduce the likelihood of bacterial resistance to clindamycin by eliminating resistant strains of *Cutibacterium acnes* (formerly *Propionibacterium acnes*).
2. **Why are topical agents commonly used for the treatment of acne?**
    - They directly target affected areas, minimizing systemic side effects while reducing inflammation, bacterial colonization, and excessive sebum production.
3. **How do topical keratolytic agents function in the treatment of acne?**
    - They promote desquamation (shedding of dead skin cells), prevent follicular plugging, and reduce the formation of comedones.
4. **Why are second-generation antihistamines preferred for patients requiring alertness?**
    - They are less lipophilic and do not readily cross the blood-brain barrier, resulting in minimal sedation compared to first-generation antihistamines.
5. **Why is benzoyl peroxide considered a first-line drug for mild to moderate acne?**
    - It has antibacterial properties against *C. acnes*, reduces inflammation, and helps prevent resistance when combined with other agents.
6. **Why is betaxolol indicated for the treatment of glaucoma?**
    - It is a selective β_1-blocker that lowers intraocular pressure by reducing aqueous humor production with minimal bronchoconstrictive effects, making it safer for patients with respiratory conditions.
7. **How does cromolyn prevent the release of inflammatory mediators from mast cells?**
    - It stabilizes mast cell membranes, preventing degranulation and the subsequent release of histamine and other inflammatory mediators.
8. **How does dextromethorphan act in the central nervous system to relieve cough?**
    - It acts on the medullary cough center by suppressing cough reflex sensitivity through NMDA receptor antagonism.
9. **How does dimenhydrinate work to reduce symptoms of motion sickness?**

- It is an H1 receptor antagonist with anticholinergic properties that suppresses vestibular stimulation and inhibits nausea and vomiting centers in the brainstem.

10. **How do H1 antagonists in over-the-counter sleep aids help induce sleep?**

- They block central histamine receptors (H1) in the brain, which leads to sedation and drowsiness.

11. **How can certain fruit juices, like orange juice, reduce the absorption of fexofenadine?**

- They inhibit intestinal OATP (organic anion transporting polypeptide), reducing drug uptake and systemic absorption.

12. **How does grapefruit juice inhibit the absorption of fexofenadine?**

- It inhibits OATP transporters in the gut, leading to decreased drug bioavailability.

13. **How do glucocorticoids alter the activity of target genes through their action in the cell nucleus?**

- They bind to glucocorticoid receptors, translocate to the nucleus, and modulate gene transcription, leading to anti-inflammatory effects.

14. **How do glucocorticoids produce anti-inflammatory and immunosuppressive effects?**

- They suppress pro-inflammatory cytokines, inhibit immune cell activation, and reduce vascular permeability.

15. **Why does glucocorticoid therapy induce osteoporosis, and what are the mechanisms involved?**

- It reduces calcium absorption, increases bone resorption, and decreases osteoblast activity, leading to bone loss.