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follows. The IR and DR pellets were prepared as set forth in Examples 1 and 2. From the assay value of the doxycycline used to make the pellets, it was determined that 41.26 mg potency of the capsules would correspond to an actual strength of 40 mg doxycycline. The potency of the IR pellets was 194 mg doxycycline per gram of pellets (mg/g), and for the DR pellets was 133 mg/g. Accordingly, it was calculated that for each capsule the fill weight of IR beads would be 159.5 mg, and for DR beads 77.6 mg, corresponding to 75:25 of IR:DR of a 40 mg capsule.

## Example 8

A pharmacokinetic (PK) study was conducted in human subjects to compare a first group taking the extended release doxycycline capsule (see Example 7) (75/25 IR/DR 40 mg) administered orally once daily versus a second group taking Periostat® tablets (20 mg) administered orally twice daily, twelve hours apart.

Pharmacokinetic blood draws were collected on Nominal Study Day 1 for first and second groups, and on Day 7 for the first group as follows: 0 (pre dose), 0.5, 1, 1.5, 2, 2.5, 3, 4, 6, 8, 12 (before the post-morning dose, if applicable), 12.5, 13, 13.5, 14, 14.5, 15, 16, 18, 20, and 24 hours after the morning dose.

The data from this study were shown in the following Table 1.

TABLE 1

	75/25 IR/DR Day 1	75/25 IR/DR Day 7 steady state	Periostat® Day 1
$T_{max}$	2.2	2.3	1.9/11.9
$C_{max}$	562	602	100/333
$AUC_{0-24}(Hr^*ng/ml)$	5388	7230	4280

Mean  $C_{max}$  at Day 1 from the 75/25 IR/DR 40 mg capsules is comparable to that from the Periostat® tablets, and well below the potential antibiotic effect concentration (1000 ng/ml). The mean  $C_{min}$  (177 ng/ml at 24-hour time point) is well above the minimum effective plasma concentration (100 ng/ml). Individual pharmacokinetic data from both 75/25 IR/DR 40 mg capsules and Periostat® 20 mg tablets show that 75/25 IR/DR 40 mg capsules provide more consistent in vivo performance in terms of less frequency of high peak plasma concentration (>1000 ng/ml) and low plasma concentration (<100 ng/ml) at the end of each dosing.

FIGS. 5 and 6 show two aspects of results obtained from the study. FIG. 5 compares the PK profiles of 75:25 IR:DR 40 mg doxycycline formulations over a 24 hour period on Day 1 and also on Day 7 (steady state). FIG. 6 compares the PK profiles of the 75:25 40 mg once daily dosage form and the Periostat® 20 mg (twice daily) dosage forms.

What is claimed is:

1. A method for treating rosacea in a mammal in need thereof, comprising administering an oral pharmaceutical composition consisting of (i) an immediate release formulation (IR) comprising about 30 mg doxycycline; (ii) a delayed release formulation (DR) comprising about 10 mg doxycycline; and (iii) a pharmaceutically acceptable excipient selected from the group consisting of binder, disintegration agent, filling agent, surfactant, solubilizer, stabilizer, plasticizer, lubricant, enteric polymers, and combinations thereof; and (iv) optionally, a controlling coat, overcoating layer, a core, and combinations thereof, wherein doxycycline is the sole active ingredient and the total amount of doxycycline in the composition is about 40 mg.

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2. The method of claim 1, wherein the mammal is a human.

3. The method of claim 1, which at a once-daily dosage, administration of the composition will give blood levels of the doxycycline of between 0.1 µg/ml to 1.0 µg/ml.

4. The method of claim 3, which at a once-daily dosage, administration of the composition will give blood levels of the doxycycline of between 0.3 µg/ml to 0.8 µg/ml.

5. The method of claim 1, wherein the pharmaceutically acceptable excipient is incorporated in the IR formulation, the DR formulation, or both.

6. The method of claim 1, wherein the binder is selected from the group consisting of methylcellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, hydroxypropyl methylcellulose, polyvinylpyrrolidone, and polyvinylpyrrolidone/vinyl acetate copolymer.

7. The method of claim 1, wherein the disintegration agent is selected from the group consisting of cornstarch, pregelatinized starch, cross-linked carboxymethylcellulose, sodium starch glycolate, and cross-linked polyvinylpyrrolidone.

8. The method of claim 1, wherein the filling agent is selected from the group consisting of lactose, calcium carbonate, calcium phosphate, calcium sulfate, microcrystalline cellulose, dextran, starches, sucrose, xylitol, lactitol, mannitol, sorbitol, sodium chloride, and polyethylene glycol.

9. The method of claim 1, wherein the surfactant is selected from the group consisting of sodium lauryl sulfate, sorbitan monooleate, polyoxyethylene sorbitan monooleate, bile salts, and glyceryl monostearate.

10. The method of claim 1, wherein the solubilizer is selected from the group consisting of citric acid, succinic acid, fumaric acid, malic acid, tartaric acid, maleic acid, glutaric acid, sodium bicarbonate, and sodium carbonate.

11. The method of claim 1, wherein the stabilizer is selected from the group consisting of antioxidation agents, buffers, and acids.

12. The method of claim 1, wherein the plasticizer is selected from the group consisting of acetyltriethyl citrate, triethyl citrate, acetyltributyl citrate, dibutylsebacate, triacetin, polyethylene glycols, and propylene glycol.

13. The method of claim 1, wherein the lubricant is selected from the group consisting of talc, colloidal silica dioxide, magnesium stearate, calcium stearate, titanium dioxide, magnesium silicate, stearic acid, polyethylene glycol, leucine, glyceryl behenate, and hydrogenated vegetable oil.

14. The method of claim 1, wherein the core comprises sugar spheres or microcrystalline spheres.

15. The method of claim 1, wherein the overcoating layer is a protective coating, color coating, or both.

16. The method of claim 1, wherein the composition is in the form of a granule, tablet, pellet, powder, sachet, capsule, gel, dispersion or suspension.

17. The method of claim 1, wherein the DR formulation comprises at least one enteric polymer.

18. The method of claim 1, wherein the enteric polymer is selected from the group consisting of cellulose acetate phthalate; hydroxypropyl methylcellulose phthalate; polyvinyl acetate phthalate; hydroxypropyl methylcellulose acetate succinate; cellulose acetate trimellitate; hydroxypropyl methylcellulose succinate; cellulose acetate succinate; cellulose acetate hexahydrophthalate; cellulose propionate phthalate; a copolymer of methylmethacrylic acid and methyl methacrylate; a copolymer of methyl acrylate, methylmethacrylate and methacrylic acid; a copolymer of methylvinyl ether and maleic anhydride; ethyl methacrylate-methylmethacrylate-chlorotrimethylammonium ethyl acrylate copolymer; zein; shellac; poly(methacrylic acid-co-ethyl acrylate) 1:1, and combinations thereof.