**INDICATION**

ARESTIN® (minocycline HCl) Microspheres, 1 mg is indicated as an adjunct to scaling and root planing (SRP) procedures for reduction of pocket depth in patients with adult periodontitis. ARESTIN® may be used as part of a periodontal maintenance program, which includes good oral hygiene and SRP.

**IMPORTANT SAFETY INFORMATION**

- ARESTIN is contraindicated in any patient who has a known sensitivity to minocycline or tetracyclines. Hypersensitivity reactions and hypersensitivity syndrome that included, but were not limited to anaphylaxis, anaphylactoid reaction, angioneurotic edema, urticaria, rash, eosinophilia, and one or more of the following: hepatitis, pneumonitis, nephritis, myocarditis, and pericarditis may be present. Swelling of the face, pruritus, fever and lymphadenopathy have been reported with the use of ARESTIN. Some of these reactions were serious. Post-marketing cases of anaphylaxis and serious skin reactions such as Stevens Johnson syndrome and erythema multiforme have been reported with oral minocycline, as well as acute photosensitivity reactions.

- THE USE OF DRUGS OF THE TETRACYCLINE CLASS DURING TOOTH DEVELOPMENT MAY CAUSE PERMANENT DISCOLORATION OF THE TEETH, AND THEREFORE SHOULD NOT BE USED IN CHILDREN OR IN PREGNANT OR NURSING WOMEN.

- Tetracyclines, including oral minocycline, have been associated with development of autoimmune syndromes including a lupus-like syndrome manifested by arthralgia, myalgia, rash, and swelling. Sporadic cases of serum sickness-like reaction have presented shortly after oral minocycline use, manifested by fever, rash, arthralgia, lymphadenopathy and malaise. In symptomatic patients, diagnostic tests should be performed and ARESTIN treatment discontinued.

- The use of ARESTIN in an acutely abscessed periodontal pocket or for use in the regeneration of alveolar bone has not been studied.

- The safety and effectiveness of ARESTIN has not been established in immunocompromised patients or in those with coexistent oral candidiasis. Use with caution if there is a predisposition to oral candidiasis.

- In clinical trials, the most frequently reported nondental treatment-emergent adverse events were headache, infection, flu syndrome, and pain.

To report SUSPECTED ADVERSE REACTIONS, contact Valeant Pharmaceuticals North America LLC at 1-800-321-4576 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

Please see accompanying full Prescribing Information.

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The cartridge tip was designed to be flexible to help reach anatomically challenging areas in the mouth. However, bending or flattening the tip may cause the cartridge to malfunction.
Clarity for reading:

**ARESTIN®**

(minocycline hydrochloride) microspheres, 1 mg

Rx only

**DESCRIPTION**

ARESTIN (minocycline hydrochloride) microspheres, 1 mg is a subgingival sustained-release product containing the antibiotic minocycline hydrochloride incorporated into a bioresorbable polymer, Poly (glutamic-co-dl-lactide) or PGLA, for professional subgingival administration into periodontal pockets. Each unit-dose cartridge delivers minocycline hydrochloride equivalent to 1 mg of minocycline free base.

The molecular formula of minocycline hydrochloride is $\text{C}_{23}\text{H}_{27}\text{N}_3\text{O}_7 \cdot \text{HCl}$, and the molecular weight is 493.94. The structural formula of minocycline hydrochloride is:

\[ \text{H} \quad \text{N} \quad \text{H} \quad \text{C} \quad \text{H} \quad \text{C} \quad \text{H} \quad \text{C} \quad \text{H} \quad \text{C} \quad \text{H} \quad \text{C} \quad \text{H} \quad \text{C} \quad \text{H} \quad \text{C} \quad \text{H} \quad \text{N} \quad \text{H} \quad \text{OH} \quad \text{NH}_2 \quad \text{HCl} \]

**CLINICAL PHARMACOLOGY**

**Mechanism of Action**

The mechanism of action of ARESTIN as an adjunct to scaling and root planing procedures for reduction of pocket depth in patients with adult periodontitis is unknown.

**Microbiology**

Minocycline, a member of the tetracycline class of antibiotics, has a broad spectrum of activity. It is bacteriostatic and exerts its antimicrobial activity by inhibiting protein synthesis. In vitro susceptibility testing has shown that the organisms *Porphyromonas gingivalis, Prevotella intermedia, Fusobacterium nucleatum, Eikenella corrodens*, and *Actinobacillus actinomycetemcomitans*, which are associated with periodontal disease, are susceptible to minocycline at concentrations of ≤8 mcg/mL; qualitative and quantitative changes in plaque microorganisms have not been demonstrated in subjects with periodontitis, using this product.

The emergence of minocycline-resistant bacteria in single-site plaque samples was studied in subjects before and after treatment with ARESTIN at 2 centers. There was a slight increase in the numbers of minocycline-resistant bacteria at the end of the 9-month study period; however, the number of subjects studied was small and the clinical significance of these findings is unknown.

The emergence of minocycline-resistant bacteria and changes in the presence of *Candida albicans* and *Staphylococcus aureus* in the gastrointestinal tract were studied in subjects treated with ARESTIN in one phase 3 study. No changes in the presence of minocycline-resistant bacteria or *Candida albicans* or *Staphylococcus aureus* were seen at the end of the 56-day study period.

**Pharmacokinetics**

In a pharmacokinetic study, 18 subjects (10 men and 8 women) with moderate to advanced chronic periodontitis were treated with a mean dose of 46.2 mg (25 to 112 unit doses) of ARESTIN. After fasting for at least 10 hours, subjects received subgingival application of ARESTIN (1 mg per treatment site) following scaling and root planing at a minimum of 30 sites on at least 8 teeth. Investigational drug was administered to all eligible sites ≥5 mm in probing depth. Mean dose normalized saliva AUC and Cmax were found to be approximately 125 and 1000 times higher than those of serum parameters, respectively.

**Clinical Studies**

In 2 well-controlled, multicenter, investigator-blind, vehicle-controlled, parallel-design studies (3 arms), 748 subjects (study OPI-103A=368, study OPI-103B=380) with generalized moderate to advanced adult periodontitis characterized by a mean probing depth of 5.90 and 5.81 mm, respectively, were enrolled. Subjects received 1 of 3 treatments: (1) scaling and root planing (SRP), (2) SRP + vehicle (bioreosorbable polymer, PGLA), and (3) SRP + ARESTIN. To qualify for the study, subjects were required to have 4 teeth with periodontal pockets of 6 to 9 mm that bled on probing. However, treatment was administered to all sites with mean probing depths of 5 mm or greater. Subjects studied were in good general health. Subjects with poor glycemic control or active infectious diseases were excluded from the studies. Retreatment occurred at 3 and 6 months after initial treatment, and any new site with pocket depth ≥5 mm also received treatment. Subjects treated with ARESTIN were found to have statistically significantly reduced probing pocket depth compared with those treated with SRP alone or SRP + vehicle at 9 months after initial treatment, as shown in Table 1.

![Diagram of minocycline hydrochloride](image-url)

**Table 1: Probing Pocket Depth at Baseline and Change in Pocket Depth at 9 Months from 2 Multicenter US Clinical Trials**

<table>
<thead>
<tr>
<th>Time</th>
<th>Study OPI-103A</th>
<th>Study OPI-103B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SRP Alone</td>
<td>SRP + Vehicle</td>
</tr>
<tr>
<td></td>
<td>n=124</td>
<td>n=123</td>
</tr>
<tr>
<td></td>
<td>n=126</td>
<td>n=126</td>
</tr>
<tr>
<td>PD (mm) at Baseline</td>
<td>5.88 ±0.04</td>
<td>5.91 ±0.04</td>
</tr>
<tr>
<td>[Mean ± SE]</td>
<td>5.79 ±0.03</td>
<td>5.82 ±0.04</td>
</tr>
<tr>
<td>PD (mm) Change from Baseline at 9 Months</td>
<td>-1.04 ±0.07</td>
<td>-1.20 ±0.07</td>
</tr>
<tr>
<td>[Mean ± SE]</td>
<td>-1.30 ±0.07</td>
<td>-1.63 ±0.07</td>
</tr>
</tbody>
</table>

SE = standard error; SRP = scaling and root planing; PD = pocket depth
Significantly different from SRP: *($P\leq0.05$); **($P\leq0.001$)
Significantly different from SRP + vehicle: ††($P<0.001$)

In these 2 studies, an average of 29.5 (5-114), 31.7 (4-137), and 31 (5-108) sites were treated at baseline in the SRP alone, SRP + vehicle, and SRP + ARESTIN groups, respectively. When these studies are combined, the mean pocket depth change at 9 months was -1.18 mm, -1.10 mm, and -1.42 mm for SRP alone, SRP + vehicle, and SRP + ARESTIN, respectively.

**Table 2: Number (Percentage) of Pockets Showing a Change of Pocket Depth ≥2 mm at 9 Months from 2 Multicenter US Clinical Trials**

<table>
<thead>
<tr>
<th>Study OPI-103A</th>
<th>Study OPI-103B</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRP Alone</td>
<td>SRP + Vehicle</td>
</tr>
<tr>
<td>Pockets &gt;2 mm (% of Total)</td>
<td>1046 (51.1%)</td>
</tr>
<tr>
<td>Pockets &gt;3 mm (% of Total)</td>
<td>417 (12.4%)</td>
</tr>
</tbody>
</table>

SRP + ARESTIN resulted in a greater percentage of pockets showing a change of PD ≥2 mm and ≥3 mm compared to SRP alone at 9 months, as shown in Table 2.

**Table 3: Mean Pocket Depth Changes (SE) in Subpopulations, Studies OPI-103A and OPI-103B Combined**

<table>
<thead>
<tr>
<th></th>
<th>Study OPI-103A</th>
<th>Study OPI-103B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SRP Alone</td>
<td>SRP + Vehicle</td>
</tr>
<tr>
<td>Smokers</td>
<td>n=91</td>
<td>-0.96 (±0.09) mm</td>
</tr>
<tr>
<td></td>
<td>n=90</td>
<td>-1.24 (±0.09) mm**</td>
</tr>
<tr>
<td>Non-smokers</td>
<td>n=159</td>
<td>-1.31 (±0.06) mm**</td>
</tr>
<tr>
<td></td>
<td>n=159</td>
<td>-1.53 (±0.06) mm**</td>
</tr>
<tr>
<td>Subjects &gt;50 YOA</td>
<td>n=21</td>
<td>-1.07 (±0.09) mm**</td>
</tr>
<tr>
<td></td>
<td>n=81</td>
<td>-1.42 (±0.08) mm**</td>
</tr>
<tr>
<td>Subjects ≤50 YOA</td>
<td>n=167</td>
<td>-1.24 (±0.06) mm**</td>
</tr>
<tr>
<td></td>
<td>n=168</td>
<td>-1.43 (±0.07) mm**</td>
</tr>
<tr>
<td>Subjects with CV Disease</td>
<td>n=36</td>
<td>-0.99 (±0.13) mm</td>
</tr>
<tr>
<td></td>
<td>n=29</td>
<td>-1.56 (±0.14) mm**</td>
</tr>
<tr>
<td>Subjects without CV Disease</td>
<td>n=214</td>
<td>-1.22 (±0.06) mm</td>
</tr>
<tr>
<td></td>
<td>n=220</td>
<td>-1.40 (±0.06) mm**</td>
</tr>
</tbody>
</table>

SRP = scaling and root planing; YOA = years of age; CV = cardiovascular
*SRP vs SRP + ARESTIN P ≤0.05; **SRP vs SRP + ARESTIN P ≤0.001

In both studies, the following patient subgroups were prospectively analyzed: smokers, subjects over and under 50 years of age, and subjects with a previous history of cardiovascular disease. The results of the combined studies are presented in Table 3. In smokers, the mean reduction in pocket depth at 9 months was less in all treatment groups than in nonsmokers, but the reduction in mean pocket depth at 9 months with SRP + ARESTIN was significantly greater than with SRP + vehicle or SRP alone.
**INDICATIONS AND USE**

ARESTIN is indicated as an adjunct to scaling and root planing procedures for reduction of pocket depth in patients with adult periodontitis. ARESTIN may be used as part of a periodontal maintenance program which includes good oral hygiene and scaling and root planing.

**CONTRAINDICATIONS**

ARESTIN should not be used in any patient who has a known sensitivity to minocycline or tetracyclines.

**WARNINGS**

The use of drugs of the Tetracycline class during tooth development (last half of pregnancy, infancy, and childhood to the age of 8 years) may cause permanent discoloration of the teeth (yellow-gray brown). This adverse reaction is more common during long-term use of the drugs, but has been observed following repeated short-term courses. Enamel hypoplasia has also been reported. TETRACYCLINE DRUGS, THEREFORE, SHOULD NOT BE USED IN THIS AGE GROUP OR IN PREGNANT OR NURSING WOMEN, UNLESS THE POTENTIAL BENEFITS ARE CONSIDERED TO OUTWEIGHT THE POTENTIAL RISKS. Results of animal studies indicate that tetracyclines cross the placenta, are found in fetal tissues, and can have toxic effects on the developing fetus (often related to retardation of skeletal development). Evidence of embryotoxicity has also been noted in animals treated early in pregnancy. If any tetracyclines are used during pregnancy, or if the patient becomes pregnant while taking this drug, the patient should be apprised of the potential hazard to the fetus. Photosensitivity manifested by an exaggerated sunburn reaction has been observed in some individuals taking tetracyclines. Patients apt to be exposed to direct sunlight or ultraviolet light should be advised that this reaction can occur with tetracycline drugs, and treatment should be discontinued at the first evidence of skin erythema.

**PRECAUTIONS**

Hypersensitivity Reactions and Hypersensitivity Syndrome

The following adverse events have been reported with minocycline products when taken orally. Hypersensitivity reactions and hypersensitivity syndrome that included, but were not limited to anaphylaxis, anaphylactoid reaction, angioneurotic edema, urticaria, rash, eosinophilia, and one or more of the following: hepatitis, pneumonia, nephritis, myositis, myocarditis, and pericarditis may be present. Swelling of the face, pruritus, fever and other problems occur. Patients should be notified to inform the dentist if itching, swelling, or other signs and symptoms of possible hypersensitivity occur.

Carcinogenicity, Mutagenicity, Impairment of Fertility

Dietary administration of minocycline in long-term tumorigenicity studies in rats resulted in evidence of thyroid tumor production. Minocycline has also been found to produce thyroid hyperplasia in rats and dogs. In addition, there has been evidence of oncogenic activity in rats in studies with a related antibiotic, oxytetracycline (i.e., adrenal and pituitary tumors). Minocycline demonstrated no potential to cause genetic toxicity in a battery of assays which included a bacterial reverse mutation assay (Ames test), an in vitro mammalian cell gene mutation test (L5178Y/TK +/- mouse lymphoma assay), an in vitro mammalian chromosomal aberration test, and an in vivo micronucleus assay conducted in ICR mice.

Fertility and general reproduction studies have provided evidence that minocycline impairs fertility in male rats.

**ADVERSE REACTIONS**

The most frequently reported non-dental, treatment-emergent adverse events in the 3 multicenter US trials were headache, infection, flu syndrome, and pain.

**SPR Alone**

N=250

62.4% 71.9% 68.1%

**SPR + Vehicle**

N=249

25.6% 28.1% 16.3%

**SPR + ARESTIN®**

N=423

12.0% 13.7% 12.3%

**SPR Alone**

N=250

6.8% 8.8% 9.9%

**SPR + Vehicle**

N=249

7.2% 8.3% 9.2%

**SPR + ARESTIN®**

N=423

7.2% 11.6% 9.0%

**SPR Alone**

N=250

6.4% 6.8% 6.4%

**SPR + Vehicle**

N=249

7.1% 7.4% 7.1%

**SPR + ARESTIN®**

N=423

1.6% 3.2% 5.0%

**Flu Syndrome**

3.2% 6.4% 5.0%

**Pharyngitis**

3.2% 1.6% 4.3%

**Infection**

3.2% 1.6% 4.3%

**Mucous Membrane Disorder**

2.4% 0.8% 3.3%
The change in clinical attachment levels was similar across all study arms, suggesting that neither the vehicle nor ARESTIN compromise clinical attachment.

To report SUSPECTED ADVERSE REACTIONS, contact Valeant Pharmaceuticals North America LLC at 1-800-321-4576 or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

**DOSAGE AND ADMINISTRATION**
ARESTIN is provided as a dry powder, packaged in a unit-dose cartridge with a deformable tip (see Figure 1), which is inserted into a spring-loaded cartridge handle mechanism (see Figure 2) to administer the product.

The oral health care professional removes the disposable cartridge from its pouch and connects the cartridge to the handle mechanism (see Figures 3 – 4). ARESTIN is a variable dose product, dependent on the size, shape, and number of pockets being treated. In US clinical trials, up to 122 unit-dose cartridges were used in a single visit and up to 3 treatments, at 3-month intervals, were administered in pockets with pocket depth of 5 mm or greater.

The administration of ARESTIN does not require local anesthesia. Professional subgingival administration is accomplished by inserting the unit-dose cartridge to the base of the periodontal pocket and then pressing the thumb ring in the handle mechanism to expel the powder while gradually withdrawing the tip from the base of the pocket. The handle mechanism should be sterilized between patients. ARESTIN does not have to be removed, as it is biodegradable, nor is an adhesive or dressing required.

**HOW SUPPLIED**
ARESTIN® (minocycline hydrochloride) microspheres, 1 mg is supplied as follows:

- NDC 65976-100-01 1 unit-dose cartridge with desiccant in a heat-sealed, foil-laminated pouch
- NDC 65976-100-24 12 unit-dose cartridges in 1 tray with desiccant in a heat-sealed, foil-laminated, resealable pouch. There are 2 pouches in each box.

Each unit-dose cartridge contains the product identifier “OP-1.”

**Storage Conditions**
Store at 20° to 25°C (68° to 77°F)/60% RH; excursions permitted to 15° to 30°C (59° to 86°F). Avoid exposure to excessive heat.

**Manufactured for:**
OralPharma, a division of Valeant Pharmaceuticals North America LLC
Bridgewater, NJ 08807 USA
U.S. Patent Numbers: 6,682,348; 7,699,609; 8,048,021; 9,566,141
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