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Add the following:

▲Acyclovir Injection

DEFINITION
Acyclovir Injection contains acyclovir sodium equivalent to NLT 90.0% and NMT 110.0% of the labeled amount of acyclovir ($C_8H_{11}N_5O_3$).

IDENTIFICATION
- **A.** The retention time of the acyclovir peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*.
- **B.** The UV spectrum of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*.

ASSAY
- **Procedure**

Mobile phase: 3 mL/L of glacial acetic acid in water

Standard stock solution: 2 mg/mL of USP Acyclovir RS in 0.1 N sodium hydroxide. Sonicate, if necessary, to dissolve prior to final dilution.

Standard solution: 0.1 mg/mL of USP Acyclovir RS in water from the *Standard stock solution*

Sample stock solution: Nominally 2 mg/mL of acyclovir prepared as follows. Transfer 4 mL of Injection to a 100-mL volumetric flask and dilute with 0.1 N sodium hydroxide to volume.

Sample solution: 0.1 mg/mL of acyclovir in water prepared from the *Sample stock solution*

Chromatographic system

(See *Chromatography ⟨621⟩, System Suitability*.)

Mode: LC

Detector: UV 254 nm. For *Identification B*, use a diode array detector in the range of 200–400 nm.

Column: 4.6-mm × 25-cm; 5-µm packing L1

Column temperature: 40°

Flow rate: 1.8 mL/min

Injection volume: 10 µL

Run time: NLT 1.5 times the retention time of acyclovir

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 2.0

Relative standard deviation: NMT 2.0%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of acyclovir ($C_8H_{11}N_5O_3$) in the portion of Injection taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times 100$$

r_U = peak response of acyclovir from the *Sample solution*

r_S = peak response of acyclovir from the *Standard solution*

C_S = concentration of USP Acyclovir RS in the *Standard solution* (mg/mL)

C_U = nominal concentration of acyclovir in the *Sample solution* (mg/mL)

Acceptance criteria: 90.0%–110.0%

IMPURITIES
- **Organic Impurities**

Solution A: 1.36 g/L of potassium dihydrogen phosphate in water. Adjust with 10% phosphoric acid to a pH of 3.0.

Solution B: Methanol

Mobile phase: See *Table 1*.

Table 1

Time (min)	Solution A (%)	Solution B (%)
0	100	0
5	100	0
40	90	10
60	58	42
61	100	0
70	100	0

Diluent: 3 mL/L of glacial acetic acid in water

Sensitivity solution: 0.5 µg/mL of USP Acyclovir RS in *Diluent*. Sonicate, if necessary, to dissolve prior to final dilution.

Standard stock solution A: 0.0265 mg/mL of USP Acyclovir RS in *Diluent*. Sonicate, if necessary, to dissolve prior to final dilution.

Standard solution A: 0.00265 mg/mL of USP Acyclovir RS in *Diluent*, from *Standard stock solution A*

Standard stock solution B: 0.035 mg/mL of USP Guanine RS prepared as follows. Transfer 3.5 mg of USP Guanine RS to a 100-mL volumetric flask and add about 25 mL of 0.1 N sodium hydroxide. Sonicate, if necessary, to dissolve and dilute with water to volume.

Standard solution B: 0.0035 mg/mL of USP Guanine RS in *Diluent*, from *Standard stock solution B*

Sample solution: Nominally 0.5 mg/mL of acyclovir in *Diluent* prepared as follows. Transfer 2 mL of Injection to a 200-mL volumetric flask and dilute with *Diluent* to volume.

Chromatographic system

(See *Chromatography ⟨621⟩, System Suitability*.)

Mode: LC

Detector: UV 254 nm

Column: 4.6-mm × 25-cm; 5-µm packing L1

Temperatures

Autosampler: 6°

Column: 40°

Flow rate: 1 mL/min

Injection volume: 50 µL

System suitability

Samples: *Sensitivity solution*, *Standard solution A*, and *Standard solution B*

Suitability requirements

Relative standard deviation: NMT 2.0% for acyclovir, *Standard solution A*; NMT 2.0% for guanine, *Standard solution B*

Tailing factor: NMT 2.0 for acyclovir, *Standard solution A*; NMT 2.0 for guanine, *Standard solution B*

Signal-to-noise ratio: NLT 10 for acyclovir, *Sensitivity solution*

Analysis

Samples: *Standard solution A*, *Standard solution B*, and *Sample solution*

Calculate the percentage of guanine in the portion of Injection taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times 100$$

r_U = peak response of guanine from the *Sample solution*

r_S = peak response of guanine from the *Standard solution B*

C_S = concentration of USP Guanine RS in *Standard solution B* (mg/mL)

C_U = nominal concentration of acyclovir in the *Sample solution* (mg/mL)

Calculate the percentage of any individual impurity in the portion of Injection taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times 100$$

r_U = peak response of any individual impurity from the *Sample solution*

r_S = peak response of acyclovir from the *Standard solution A*

C_S = concentration of USP Acyclovir RS in *Standard solution A* (mg/mL)

C_U = nominal concentration of acyclovir in the *Sample solution* (mg/mL)

Acceptance criteria: See *Table 2*.

Table 2

Name	Relative Retention Time	Acceptance Criteria, NMT (%)
Guanine	0.35	0.7
Acyclovir	1.0	—
Bis-acyclovir[a]	2.8	0.5
Any individual unspecified impurity	—	0.2
Total impurities[b]	—	1.0

[a] Bis({9-[(2-hydroxyethoxy)methyl]guanine}-N^2-yl)methane.

[b] Total impurities excludes guanine.

SPECIFIC TESTS

- **Bacterial Endotoxins Test ⟨85⟩:** Meets the requirements
- **Particulate Matter in Injections ⟨788⟩:** Meets the requirements
- **Sterility Tests ⟨71⟩:** Meets the requirements
- **pH ⟨791⟩:** 10.85–11.50
- **Other Requirements:** It meets the requirements in *Injections and Implanted Drug Products ⟨1⟩*.

ADDITIONAL REQUIREMENTS

- **Packaging and Storage:** Preserve in single-dose containers, preferably of Type I glass. Store at controlled room temperature.
- **USP Reference Standards ⟨11⟩**
  USP Acyclovir RS
  USP Guanine RS

2-Amino-1,7-dihydro-6*H*-purin-6-one.

$C_5H_5N_5O$ 151.13▲ (USP 1-May-2022)

Auxiliary Information - Please check for your question in the FAQs before contacting USP.

Topic/Question	Contact	Expert Committee
ACYCLOVIR INJECTION	Documentary Standards Support	SM12020 Small Molecules 1

Chromatographic Database Information: Chromatographic Database

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