※※ Revised: December 2015 (5th version)
※ Revised: July 2007

Standard Commodity Classification No. of Japan:
87314

Storage : 100 mg : Store at room temperature
500 mg : Store at a cold place
2 g : Store at a cold place

Expiration date : Do not use after the expiration date indicated on the outer package

Prescription drug
(Caution – Use only pursuant to the prescription issued of physician, etc.)

Japanese Pharmacopoeia

Ascorbic Acid Injection

	100 mg	500 mg	2 g
Approval No.	(61AM) 2218	(61AM) 2219	(61AM) 2220
Date of listing in the NHI reimbursement price	June 1957	June 1957	September 1981
Date of initial marketing in Japan	June 1957	June 1957	September 1981
Date of latest reexamination	May 1977		

Vitamin C Injection 100mg "Fuso"
Vitamin C Injection 500 mg "Fuso"
Vitamin C Injection 2g "Fuso"

DESCRIPTION

***1. Composition**

Vitamin C Injection "Fuso" 100 mg is a colorless and clear pain-free aqueous injection containing ascorbic acid 100 mg in 1 mL per ampoule.
It contains sodium pyrosulfite 0.5 mg, sodium thioglycolate 1 mg, benzyl alcohol 10 mg, and pH adjuster as excipients.
Vitamin C Injection "Fuso" 500 mg is a colorless and clear aqueous injection containing ascorbic acid 500 mg in 2 mL per ampoule.
It contains sodium pyrosulfite 2 mg, sodium thioglycolate 2 mg, and pH adjuster as excipients.
Vitamin C Injection "Fuso" 2 g is a colorless and clear aqueous injection containing ascorbic acid 2,000 mg in 10 mL per ampoule.
It contains sodium pyrosulfite 10 mg, sodium thioglycolate 10 mg, and pH adjuster as excipients.

2. Product Description

Vitamin C Injection "Fuso" 100 mg is a colorless and clear aqueous injection in an ampoule.

Vitamin C Injection "Fuso" 500 mg is a colorless and clear aqueous injection in an ampoule.

Vitamin C Injection "Fuso" 2 g is a colorless and clear aqueous injection in an ampoule.

	pH	Osmotic pressure ratio
Vitamin C Injection "Fuso" 100 mg	5.6～7.4	4.0～5.0
Vitamin C Injection "Fuso" 500 mg		9.1～10.5
Vitamin C Injection "Fuso" 2 g		7.3～8.5

INDICATIONS

◇ Prevention and treatment of vitamin C deficiency (scurvy, Möller-Barlow's disease)

◇ Supplementation of vitamin C when its demand increases and intake from meals is insufficient (wasting disease, during pregnancy and delivery, nursing women, vigorous physical work, etc.)

◇ Vitamin C deficiency or metabolic disorder presumed to be involved in the following diseases:
- capillary bleeding (epistaxis, gingival bleeding, hematuria, etc.)
- drug poisoning
- adrenocortical dysfunction
- promotion of bone matrix formation/bone fusion for bone fracture
- pigmentation due to chloasma, ephelis, or inflammation
- photosensitive dermatitis

For the above symptoms, Vitamin C Injection "Fuso" should not be administered aimlessly, with the exception of the indications "Prevention and treatment of vitamin C deficiency" and "Supplementation of vitamin C when its demand increases and intake from meals is insufficient".

DOSAGE AND ADMINISTRATION

Vitamin C Injection "Fuso" 100 mg: Usually, for adults, administer 50 to 2,000 mg per day as ascorbic acid divided into one to several doses, by subcutaneous, intramuscular, or intravenous injection.
The dose may be increased or decreased according to age and symptom.
Vitamin C Injection "Fuso" 500 mg, 2 g: Usually, for adults, administer 50 to 2,000 mg per day as ascorbic acid divided into one to several doses, by intravenous injection.
The dose may be increased or decreased according to age and symptom.

PRECAUTIONS

****1. Pediatric Use**

Vitamin C Injection "Fuso" 100 mg: This product should be administered with care to low birth weight babies and newborn babies. [Toxic symptoms (gasping, acidosis, convulsion, etc.) were reported overseas in low birth weight babies after a large dose (99 – 234 mg/kg) of benzyl alcohol was administered. Vitamin C Injection "Fuso" 100 mgcontains benzyl alcohol as an excipient.]

2. Effects on Laboratory Tests

(1) Vitamin C Injection "Fuso" may interfere with the detection of urinary glucose in various urinary glucose tests (due to ascorbic acid).

(2) Results of various urinalyses (occult blood, bilirubin, nitrite) and fecal occult blood tests may become pseudo-negative (due to ascorbic acid).

3. Precautions for Use

(1) **When cutting an ampoule:** Vitamin C Injection "Fuso" uses a clean-cut ampoule (CC ampoule) that aims to prevent the solution from being contaminated with microparticle glass when cutting the ampoule. As with conventional products, it is desirable to clean the ampoule with ethanol before use to ensure further safety.

(2) **Precautions for subcutaneous/intramuscular administration:**
The following precautions should be taken before subcutaneous/intramuscular injection to avoid any impact on tissues and nerves.
1) Inject the agent while avoiding contact with nerves.
2) If repeated administration is required, change the injection site (e.g. alternate between the right and left arms).
Repeated injection is not recommended in infants, toddlers, and children.
3) If a patient complains of severe pain or the blood backflows when inserting a needle, immediately pull out the needle and change the site of injection.

(3) **Precautions for subcutaneous/intramuscular administration:**
Subcutaneous/intramuscular injection may cause pain at the injection site.

(4) **Precautions for intravenous injection:** Since angialgia may develop by intravenous injection, this product should be administered as slowly as possible.

PHARMACOLOGY

◇ **Collagen formation enhancement effect**

Pathological findings of scurvy indicate the causes to be lowered collagen synthesis of the bone, teeth, and other connective tissues.[1, 2)]

An experiment in guinea pigs fed with a scurvy inducing diet was conducted to investigate the effect of ascorbic acid on connective tissue formation using skin regeneration as an index. Administration of ascorbic acid increased production of hydroxyproline and decreased non-collagen proline in tissue, and the result suggested conversion of a proline containing substance to collagen at the injury site.[3)]
Synthesis of epithelial basement membrane composed of a compound similar to collagen in the connective tissue was also dependent on ascorbic acid, and some signs of scurvy were caused by insufficient synthesis of basement membrane.[4)]

◇ **Adrenal defense mechanism[5)]**

After loading stress to rats by epinephrine injection, the eosinophil count was decreased, and alarm reaction of the adrenal glands was suggested by histological images. In animals pretreated with ascorbic acid, the eosinophil count was significantly increased, and histological images of the adrenal glands were normal. Ascorbic acid was therefore suggested to have an adrenal defense mechanism.

◇ **Impact on melanin synthesis[6)]**

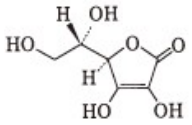
Results of *in vitro* experiments showed that ascorbic acid inhibited production of dopachrome based on its reduction mechanism for oxidization of dopaquinone to dopachrome. After administration of a large dose of ascorbic acid to guinea pigs and rabbits, the amount that might possibly inhibit dopachrome synthesis *in vitro* was distributed to the skin.

PHYSICOCHEMISTRY

Nonproprietary name : Ascorbic acid

Chemical name : L-*threo*-hex-2-enono-1,4-lactone

Structural formula:



Molecular formula : $C_6H_8O_6$

Molecular weight : 176.12

Melting point : ca. 190°C (decomposition)

Description: This product occurs as white crystal or crystalline powder with no odor and acid taste. It is freely soluble in water, sparingly soluble in ethanol (95), and practically insoluble or insoluble in diethyl ether.

PACKAGING

Vitamin C Injection "Fuso" 100 mg	1 mL	50 ampoules
Vitamin C Injection "Fuso" 500 mg	2 mL	50 ampoules
Vitamin C Injection "Fuso" 2 g	10 mL	50 ampoules

REFRENCES

1) Fullmer, H. M. et al., Ann. New York Acad. Sci., **92**, 286（1961）
2) Kajiwara A, The Medical Frontline, **17**, 1429（1962）
3) Gould, B. S. et al., J. Biol. Chem., **226**, 289（1957）
4) Priest, R. E., Nature, **225**, 744（1970）
5) Bacchus, H. et al., Science, **113**, 269（1951）
6) Takenouchi K et al.:, Vitamine, **28**, 501（1963）

Manufactured and Marketed by:

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