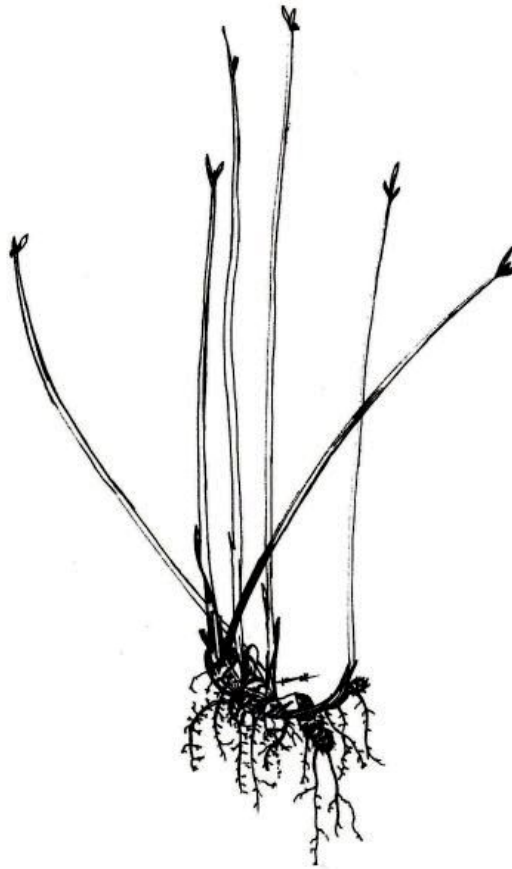


Technical Data Report

for

Piri-Piri **(*Cyperus articulatus*)**



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Piri-Piri

Family: Cyperaceae

Taxon: *Cyperus articulatus* L.

Synonyms: *Cyperus corymbosus* Rottb., *Chlorocyperus articulatus* Rikli., *Cyperus diphyllus* Retz., *Cyperus niloticus* Forssk., *Cyperus nodosus* Humb. & Bonpl. ex Willd., *Cyperus subnodosus* Nees & Meyen

Common Names: adrue, andek, chintul, guinea rush, hadrue, huaste, ibenki, ibenkiki, jointed flat sedge, kajiji, kamaleji, karihi, mandassi, masho huaste, nihue huaste, nuni, piriprioca, piri-piri, piri piri, piripiri, priprioca, piripiri de sangre, piripiri de vibora, savane tremblante, shakó, waste, yahuar piripiri, zacoo

Part Used: Rhizome

Herbal Properties & Actions		
Main Actions:	Other Actions:	Standard Dosage: Rhizome
stops vomiting	kills bacteria	Infusion: 1 cup twice daily
aids digestion	kills yeast	Fluid Extract: 2 ml 2-3 times daily
eases diarrhea	contraceptive	Capsules: 1-2 g twice daily
relieves gas		
calms & sedates		
reduces seizures		
expels intestinal worms		
prevents convulsions		

Piri-piri is a type of reed-like tropical grass called a “sedge-grass.” It can attain the height of 6 feet and grows in damp, marshy and flooded areas along the rivers and streams (where it can help control soil erosion) in the Amazon basin. It grows in clumps from dividing rhizomes which are about 2 cm long and 1.5 cm in diameter. The tall green stems are fibrous, round, and hollow and can be up to 3/4 in. wide at the base. Piri-piri stems have sometimes been used like reeds in basket-making and other crafts by the locals in the Amazon. It produces small, white, wheat-like flowers at the very top of its long stems.

Piri-piri is in the *Cyperaceae* plant family which include approximately 36 genera and about 128 species of *Cyperus*. Although native to the Amazon, piri-piri can be found in many other tropical areas and countries, including the southern United States, Africa, Asia, Australia, and across the South American continent. It can be found growing alongside the Nile River in Africa just as it grows alongside the Amazon River in South America.

TRIBAL AND HERBAL MEDICINE USES

The indigenous Indian tribes of the Amazon region ascribe magical properties to piri-piri. The tall stems and/or the rhizomes are dried and powdered, or are prepared as a tea and used as a good luck charm or a love potion (called a pusanga). Women will cultivate the plant and bathe their children with it to prevent sickness and injury, and give it to their husbands to bring good luck in hunting and fishing. Piri-piri is also well used as a medicine by the indigenous people and the rhizome is the part of the plant which is used.

The Shipibo-Conibo Indians of the Peruvian Amazon grind up the fresh rhizomes to extract the juice and use it for a nerve tonic in cases of stress and nervous and mental disorders (including

epilepsy), to treat and prevent a wide range of digestive and gastrointestinal disorders, to facilitate child birth or to induce an abortion, as a contraceptive, and for throat cancer. It is also put on the head as a hair tonic and to treat or prevent baldness, and used externally to heal wounds and treat snake bite. The Secoya Indians in Ecuador mix the ground rhizome with water and use it to treat fever, flu, and to allay fright and nervousness. The Ese'ēja Indians use it for diarrhea and dysentery.

Piri-piri also has a long history of use in herbal medicine systems in South America. It is a very common remedy to treat nausea, vomiting, stomachaches, and intestinal gas throughout the continent. In Peru, piri-piri is considered as an abortifacient, anticonvulsant, anti-epileptic, antivenin, carminative, contraceptive, hemostat, nervine, stomachic, tonic and vulnerary. It is used for diarrhea, dysentery, digestive disorders and intestinal infections, intestinal worms, epilepsy, to stop bleeding (internally and externally) and to heal wounds. In Africa, piri-piri is used for malaria, toothaches, headaches, diarrhea, indigestion and coughs.

Piri-piri has also been around for quite a few years in the United States. In the late 1800s and early 1900s a fluid extract of the rhizome was prepared and sold as a herbal drug (called "adrué") for the treatment of nausea, vomiting (including morning sickness), digestive disorders and intestinal gas. In herbal medicine systems in the U.S. piri-piri is attributed with anthelmintic, anti-emetic, carminative, demulcent, nervine, stomachic, tonic, and sedative actions.

PLANT CHEMICALS

Piri-piri contains flavonoids, polyphenols, saponins, tannins, terpenes and sugars. Many of its biological actions are attributed to various sesquiterpenes called cyperones which are also found in other *Cyperus* plants in the family.¹⁻³ Two of these chemicals, called cyperotundone and alpha-cyperone, have been reported with antimalarial actions,⁴ as well as the ability to inhibit nitric oxide synthesis (a pro-oxidant), and prostaglandin synthetase (aspirin and ibuprofen are prostaglandin synthetase inhibitors).⁵

The terpene chemicals documented in piri-piri thus far include: alpha-corymbolol, alpha-cyperone, alpha-pinene, carophyllene oxide, corymbolone, cyperotundone, iso-patchoul-4(5)-en-3-one, mandassidione, and mustakone.

BIOLOGICAL ACTIVITIES AND CLINICAL RESEARCH

Some of the more recent research on piri-piri has focused on its traditional uses to treat epilepsy and convulsions. Researchers in Africa have published several studies which suggest that piri-piri can mediate many of the brain chemical reactions which are required in epilepsy and report that the rhizome has anti-epileptic actions.⁶⁻⁸ In addition, other laboratory research with animals reports that piri-piri also has anti-convulsant actions,⁸⁻¹¹ as well as sedative actions.¹² Piri-piri was also reported with antioxidant actions,¹³ antibacterial actions against *Staphylococcus* and *Pseudomonas*,^{14,15} and anti-yeast actions against *Candida*.¹⁶ It passed a preliminary screening test to predict antitumor actions in other research.¹⁴

CURRENT PRACTICAL USES

Herbal practitioners in both South and North America usually turn to piri-piri to relieve nausea, vomiting, intestinal gas and diarrhea—its main uses in herbal medicine systems on both continents. Its use for epilepsy and convulsions is rather new in comparison to its long history of use for stomach complaints and no human trials exist yet for this purpose. People with epilepsy should not attempt to replace their prescribed drugs for epilepsy with this natural remedy until further research is available.

PIRI-PIRI PLANT SUMMARY	
Main Actions (in order): anti-emetic, stomachic, carminative, nervine, anticonvulsant	
Main Uses: 1. for vomiting and nausea 2. for digestive and intestinal disorders 3. for stress, anxiety, and nervousness 4. for intestinal worms 5. for epilepsy and convulsions	
Properties/Actions Documented by Research: antibacterial, anticandidal, anticonvulsant, anti-epileptic, antimalarial, antioxidant, sedative	
Properties/Actions Documented by Traditional Use: abortifacient, anthelmintic, anticonvulsant, anti-epileptic, antivenin, carminative, contraceptive, demulcent, hemostat, nervine, stomachic, tonic and vulnerary	
Cautions: Avoid if seeking to become pregnant.	

Traditional Preparation: While locals in the Amazon simply grind up or juice the rhizome in a little water to administer it, piri-piri is usually sold here in the U.S. and in pharmacies and stores in South America as a fluid extract or in capsules. The suggested dosage is 30 drops (2 ml) of a rhizome extract or 1-2 grams in capsules, as needed, to stop vomiting and to aid digestive and intestinal functions.

Contraindications: This plant has been traditionally used as a contraceptive aid. While no clinical studies exist to support this traditional use, women seeking to get pregnant should probably avoid the use of this plant.

Drug Interactions: None reported.

WORLDWIDE ETHNOMEDICAL USES	
Africa	as a fumigant; for diarrhea, coughs, headaches, indigestion, malaria, and toothaches
Brazil	for dysentery, fevers, headaches
Colombia	as an antivenin; for snakebite
Guyana	for stomachaches
Jamaica	for diarrhea, pain in the bowels, and vomiting
Peru	as an abortifacient, anticonvulsant, anti-epileptic, antivenin, carminative, contraceptive, hemostat, nervine, stomachic, tonic and vulnerary; for baldness, childbirth, conjunctivitis, convulsions, coughs, diarrhea, digestive disorders, dysentery, dyspepsia, epilepsy, fevers, flu, gastrointestinal disorders, good luck, hemorrhages, intestinal infections, love-charm, mental disorders, nausea, nervous disorders, rheumatic pain, snakebite, spasms, stress, throat cancer, tumors, vomiting, wounds

WORLDWIDE ETHNOMEDICAL USES	
United States	as an anthelmintic, anti-emetic, carminative, demulcent, nervine, stomachic, tonic and sedative; for aches, breast pain, digestive disorders, epilepsy, headaches, intestinal gas, menstrual irregularity, morning sickness, nausea, ophthalmia, stomach pain, urinary disorders, vaginal discharge, vomiting

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Ethnomedical Information on Piri-Piri (*Cyperus articulatus*)

Part / Location	Documented Ethnomedical Uses	Type Extract / Route	Used For	Ref #
Rhizome / Africa	Used for toothaches, headaches, diarrhea, indigestion, and coughs.	Not stated	Human Adult	ZZ1020
Rhizome / Brazil	Used for fevers.	Infusion / Oral Resin / External	Human Adult	K26363
Rhizome / Colombia	Used as an antivenin for snakebite.	Not stated	Human Adult	ZZ2010
Rhizome / Ecuador	Secoyas mix ground rhizome with water for fever, influenza, and to allay fright.	Maceration / Oral	Human Adult	L04137 ZZ1005 ZZ1104 ZZ2007
Rhizome / Guyana	Used for stomachache.	Not stated / Oral	Human Adult	ZZ1104
Rhizome / Jamaica	Used to stop vomiting in yellow fever and other diseases. Used as a stimulant; for diarrhea. Used for pains in the bowel.	Infusion / Oral Decoction / Oral Tincture / Oral	Human Adult	ZZ1020
Rhizome / Nigeria	Used for malaria.	Not stated	Human Adult	J16227
Rhizome / Peru	Used for snakebite: the fresh raw rhizome is chewed fresh and the juice swallowed, then the pulp is put onto the bite after it has bled.	Raw / Oral Masticated / External	Human Adult	L04137 ZZ2003 ZZ2007 ZZ2013
Rhizome / Peru	Shipibo-Conibo use it to treat and prevent gastrointestinal disorders. Used as a contraceptive. Used as a hair tonic and for baldness. Juice taken as a birthing aid, to prevent a bad birth, and as a hemostat. Juice taken as a nerve tonic; in cases of stress, nervous and mental disorders. Juice is taken for malignant tumors and throat cancer. Juice is taken as an abortifacient.	Maceration / Oral Maceration / Oral Maceration / External Fresh juice / Oral Fresh juice / Oral Fresh juice / Oral Fresh juice / Oral	Human Adult	ZZ2003
Rhizome / Peru	Shipibo-Conibo use it against bad spirits and negative energy in children. Powder sprinkled over the body to calm fright and prevent sickness.	Maceration / External Powder / External	Human Child Human Adult	ZZ2003
Rhizome / Peru	Used for dysentery and other severe intestinal infections.	Raw / Oral	Human Adult	K28202

Part / Location	Documented Ethnomedical Uses	Type Extract / Route	Used For	Ref #
Rhizome / Peru	Used for digestive disorders. Used as a rheumatic pain reliever.	Infusion / Oral Poultice / External	Human Adult	ZZ2007
Rhizome / Peru	Used for dysentery.	Raw / Oral	Human Adult	L03868 ZZ1093
Rhizome / Peru	The Ese'eja use it for dysentery.	Not stated	Human Adult	ZZ2007
Rhizome / Peru	Used as a contraceptive.	Infusion / Oral	Human Adult	T04785
Rhizome / Peru	Used for intestinal infections. Used for healing wounds.	Decoction / Oral Decoction / External	Human Adult	J15343
Rhizome / Peru	Powdered rhizome or rhizome juice used as a cicatrizant and hemostat for wounds and external hemorrhages. Juice dropped into eyes for conjunctivitis. Used for diarrhea, dysentery, and spasms. Used for fractures and dislocations. Used for intestinal worms, and postpartum and intestinal hemorrhages.	Various / External Fresh juice / External Decoction / Internal Poultice / External Fresh juice / Oral	Human Adult	ZZ2011
Rhizome / Peru	Used for "bad air" or bad energy. Used to treat epilepsy and nervous disorders.	Decoction / Oral	Human Adult	ZZ2013
Rhizome / USA	Used to control nausea, vomiting, stomach pain, and gas. Used for headaches, epilepsy, blood in the urine, menstrual irregularity, breast pain, and vaginal discharge. Has anti-emetic, carminative, and sedative properties.	Tincture / Oral	Human Adult	ZZ2018
Rhizome / USA	Used to check vomiting and as a tonic (2 ml fluid extract).	Fluid Extract / Oral	Human Adult	PP1001
Rhizome / USA	Used as aromatic tonic, anti-emetic, and anthelmintic. (Called adrué)	Not stated / Oral	Human Adult	PP1002
Rhizome / USA	Considered gently stimulating, warming, diffusive, and demulcent. Used for vomiting, and as a gastric tonic. Used to soothe the nervous system and increase skin circulation.	Infusion / Oral	Human Adult	PP1003
Rhizome / USA	Mucilage considered excellent wash in ophthalmia.	Not stated / External	Human Adult	PP1003
Rhizome / USA	As an anti-emetic and carminative; for digestive disorders, vomiting, and intestinal gas.	Decoction / Oral Fluid Extract / Oral	Human Adult	PP1004

Part / Location	Documented Ethnomedical Uses	Type Extract / Route	Used For	Ref #
Rhizome / USA	Used as an anti-emetic and carminative; for morning sickness. Acts as a sedative in dyspeptic disorders.	Fluid extract / Oral	Human Adult	ZZ1052
Rhizome / USA	Used as an anti-emetic (30 drops).	Fluid Extract / Oral	Human Adult	ZZ2019
Leaves / Guinea	Used as a cerebral antimalarial.	Infusion / Nasal	Human Adult	K27039
Leaves / Peru	Used for wounds and hemorrhages.	Chopped / External	Human Adult	ZZ1093
Leaves / Peru	Used for coughs.	Infusion / Oral	Human Adult	ZZ2011
Leaf+flower / Peru	Used as a love charm or love potion (to attract and bring love).	Infusion / Oral	Human Adult	ZZ1093 ZZ2013
Stem / Guiana	Palikur Indians rub the pounded stem on the nose to control snoring.	Powder / External	Human Adult	ZZ1104 L04137
Shoots / Peru	Chopped shoots used as a hemostatic and vulnerary.	Not stated / External	Human Adult	L04137 ZZ1027
Plant / Africa	Used as a fumigant.	Not stated	Human Adult	ZZ1022 ZZ1106
Plant / Brazil	Used for dysentery and headaches.	Not stated	Human Adult	PP1009
Plant / Peru	Used for fevers and flu.	Not stated	Human Adult	ZZ1105
Plant / Peru	Considered a "magical" plant in the Madre de Dios region and used by women. They bathe their children with it to prevent illness and to bring good luck. Also used to bring good luck in hunting and fishing, and as a love potion.	Baths / External	Human Adult Human Child	ZZ2009
Plant / Peru	Entire plant decocted as an abortifacient and antivenin.	Decoction / Oral	Human Adult	ZZ2013
Plant / Peru	Used as an abortifacient.	Infusion / Oral	Human Adult	A04471 L04137 ZZ2007
Plant / Egypt	Used for colic.	Not stated	Human Adult	ZZ1022 ZZ1106
Plant / Hawaii	Used for aches.	Not stated	Human Adult	ZZ1022
Plant / Not stated	Used as a sedative; for dyspepsia.	Not stated	Human Adult	ZZ1022

Presence of Compounds in Piri-Piri (*Cyperus articulatus*)

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Carophyllene oxide	Sesquiterpene	Rhizome essential oil	Brazil	4.6% to 28.5%	PP1009
Corymbolol, alpha	Sesquiterpene	Rhizome	Cameroon	Not stated	M17334 T13735
Corymbolone	Sesquiterpene	Rhizome	Cameroon	Not stated	M17334 T13735
Cyperone, alpha	Sesquiterpene	Rhizome	Cameroon	Not stated	M17334
Cyperotundone	Sesquiterpene	Entire Plant Entire Plant Rhizome	Canada Canada Canada	Not stated Not stated Not stated	A02886 A02909 W03756
Mandassidione	Sesquiterpene	Rhizome	Cameroon	Not stated	M17334
Mustakone	Sesquiterpene	Rhizome Essential oil	Cameroon Brazil	Not stated 7.3% to 14.5%	M17334 PP1009
Patchoul-4(5)-en-3-one, iso	Sesquiterpene	Rhizome	Cameroon	Not stated	M17334
Pinene, alpha	Sesquiterpene	Rhizome essential oil	Brazil	0.7% to 12.9%	PP1009

Biological Activities of Piri-Piri (*Cyperus articulatus*)

Plant Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Rhizome - Cameroon	Anti-epileptic Activity	H2O ext	Rat cortex	0.5 mg/ml	Active		J19348
Rhizome - Cameroon	Anti-epileptic Activity	H2O ext	Rat Brain	0.5 mg/ml	Active	Reduced spontaneous epileptiform discharges and NMDA-induced epolarisations	L23992
Rhizome - Cameroon	Receptor Inhibition (for anti-epileptic activity)	H2O ext	Rat Brain	0.3 mg/ml	Active	Inhibited n-methyl-d-aspartate (NMD) receptor binding.	L23992
Rhizome - Cameroon	Receptor Inhibition (for anti-epileptic activity)	H2O ext	Rat Brain	ED50: 1.3 micromols	Active	Inhibited 50% of glutamate-induced inward current through hNMDAR1A/2A receptors.	T06340
Rhizome - Cameroon	Receptor Inhibition (for anti-epileptic activity)	H2O ext	Rat Brain	ED50: 30 micromols	Active	Decreased excitation (NMDA receptor antagonists) and increased inhibition (GABA(B) receptor agonists) in the central nervous system.	T06340
Rhizome - Cameroon	Binding Activity	H2O ext ETOAC ext	Rat cortex	178 mcg/ml 36.0 mcg/ml	Active Active	Glycine receptor binding	J19348
Rhizome - Cameroon	Anticonvulsant Activity	MEOH ext	IP Mouse	ED50: 306 mg/kg	Active	vs. maximal electroshock- and pentylenetetrazol-induced seizures	L15103
Rhizome - Cameroon	Anticonvulsant Activity	MEOH ext	IP Mouse	50 mg/kg	Active	vs. strychnine-, bicuculline-, & n-methyl-d-aspartate- induced convulsions and excitation	PP1007
Rhizome - Cameroon	Anticonvulsant Activity	MEOH ext	IP Mouse	Not stated	Active	vs. maximal electroshock- and pentylenetetrazol-induced seizures.	PP1010

GI = Gastric Intubation IG = Intragastric IP = Intraperitoneally IV = Intravenously SC = Subcutaneously PO = Orally

Plant Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Rhizome - Cameroon	Locomotor Activity	Decoction	IP Mouse	0.02 gm/kg	Active	Decreased locomotor activity.	L14930
Rhizome - Cameroon	Sedative Activity	Decoction	IP Mouse	2.0 gm/kg	Active	vs. sodium thiopental-induced and diazepam-induced sleep time	L14930
Rhizome - Cameroon	Analgesic Activity	Not stated	Mouse	2 gm/kg	Inactive	vs. uphold tail in hot water	L14930
Rhizome - Cameroon	Smooth Muscle Relaxant Activity	Decoction	IP Mouse	2.0 gm/kg	Inactive		L14930
Rhizome - Peru	Anticrustacean Activity	MEOH ext CH2CL2 ext	In vitro	ED50: 69 mcg/ml DE50: 33 mcg/ml	Active Active	Assay system is intended to predict for antitumor activity.	K28202
Rhizome - Nigeria	Antimalarial Activity	ETOH-H2O ext	Not stated	Not stated	Active	<i>Plasmodium falciparum</i>	J16227
Rhizome - Peru	Antioxidant Activity	MEOH ext	In vitro	IC50: 171.8 mg/ml	Active	Measured by quenching of Luminol-enhanced chemiluminescence.	L03868
Rhizome - Peru	Antibacterial Activity	Decoction	Broth culture	25/mg/ml	Active Active Inactive Inactive Inactive Inactive	<i>Staphylococcus aureus</i> <i>Pseudomonas aeruginosa</i> <i>Mycobacterium gordonae</i> <i>Escherichia coli</i> <i>Klebsiella pneumoniae</i> <i>Salmonella gallinarum</i>	K28202
Rhizome - Peru	Antibacterial Activity	Decoction	Agar plate	Not stated	Active Active Inactive Inactive Inactive Inactive	<i>Staphylococcus aureus</i> <i>Pseudomonas aeruginosa</i> <i>Mycobacterium gordonae</i> <i>Escherichia coli</i> <i>Klebsiella pneumoniae</i> <i>Salmonella gallinarum</i>	J15343
Rhizome - Peru	Anti-yeast Activity	Decoction	Broth culture	25/mg/ml	Inactive	<i>Candida albicans</i>	K28202
Rhizome - Brazil	Anti-yeast Activity	ETOH ext	Agar plate	Not stated	Active	<i>Candida albicans</i>	PP1008

GI = Gastric Intubation IG = Intragastric IP = Intraperitoneally IV = Intravenously SC = Subcutaneously PO = Orally

Plant Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Rhizome - Peru	DNA Binding Effect	MEOH ext	In vitro	1.0 mg/ml	Inactive	DNA-Methyl green assay.	K28202
Rhizome - Nigeria	Insecticide Activity	Powder Petroleum ext MEOH Ext	In vivo	1%	Active	<i>Tribolium confusum</i> adult	L09384
Rhizome - Nigeria	Antifeedant Activity	Petroleum ext MEOH Ext	In vivo	Not stated	Active	<i>Tribolium confusum</i> adult	L09384

Biological Activities of Compounds in Piri-Piri (*Cyperus articulatus*)

Compound	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Alpha-cyperone	Antimalarial Activity	In vitro	5.5 mcg/ml	Active		PP1006
Cyperotundone	Nitric Oxide Synthesis Inhibition Activity	Cell culture	IC50: 7.8 mcg/ml	Active	Macrophage cell line vs. LPS- induced nitric oxide production	L15243
Cyperotundone	Prostaglandin Synthetase Inhibition	In vitro	IC50: 520 micromols	Active	Rabbit microsomes	T08539

GI = Gastric Intubation IG = Intragastric IP = Intraperitoneally IV = Intravenously SC = Subcutaneously PO = Orally

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