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PATIENT GUIDE

Semax *for brain health*

Semax is a nasal peptide developed in Russia from a fragment of the hormone ACTH. Its research comes mainly from rat studies and small Russian clinical reports.

COMPOUND	CLASS	ROUTE	RESEARCH	SOURCES
Semax (MEHFPGP)	Heptapeptide	Nasal	Small, mostly Russian	35 · PMID linked

§ 01

Overview

Semax is a short peptide, seven amino acids long, that was designed in Russia from a small piece of a hormone your own body makes. In Russia it is a registered medicine, sold as nasal drops at two strengths.[27] It has been studied there for more than three decades as a way to protect and support the brain, most of all after a stroke, and in laboratory animals it raises the level of a growth factor that nerve cells depend on.[1][2][3]

The laboratory work is detailed and consistent. The human studies are encouraging, though most are small, come from one country and are published in Russian with short English summaries. This guide says which kind of study each finding comes from, and every source is listed at the end with a link so you can read it yourself.

7	**Amino acids long.** Semax is Met Glu His Phe Pro Gly Pro: four amino acids from the hormone ACTH followed by a stabilizing Pro Gly Pro tail. It is built from a part of ACTH that affects behavior in animals but lacks the hormone's effects on the adrenal glands.[27]
1.4x	**More BDNF in rats.** A single nasal dose raised the growth factor BDNF in the rat hippocampus, a memory center of the brain, to 1.4 times its usual level.[3]
110	**Stroke patients in a 2018 study.** In people recovering from stroke, those given semax had higher blood levels of BDNF and better scores for daily living than those who were not.[2]
8 to 5	**Advisory committee vote.** In July 2026 an FDA advisory committee voted 8 to 5 in favor of allowing semax in pharmacy compounding. Since 30 October 2026 a temporary federal policy has allowed it as a nasal preparation only.[28][29][30]

§ 02

What semax is

Your pituitary gland makes a hormone called ACTH, which tells the adrenal glands to release cortisol. Researchers had found that a short piece of ACTH, the stretch numbered 4 to 10, keeps the full hormone's effects on behavior and learning in animals but not its hormonal effects. Scientists working within the Russian Academy of Sciences kept the first four amino acids of that piece and added three more, proline, glycine and proline, to the end, creating semax.[27] [1] In rat blood, semax turned out to be more stable than the original fragment against some of the enzymes that break such peptides down. [4]

The developers described it in 1997 as one of the rare regulatory peptides to have gone all the way from basic research to medical use.[1] It is now a registered medicine in Russia, available as 0.1% and 1% nasal drops, but it has no monograph in the European, Japanese or International pharmacopoeias and is not part of any FDA approved medicine. [27]

SEMAX AT A GLANCE	
Name	Semax
Also called	ACTH(4 to 7)PGP, the name used in the research literature[5]; in single letter code, MEHFPGP
Sequence	Met Glu His Phe Pro Gly Pro (seven amino acids). The free base weighs 813.9 g/mol; an acetate salt also exists[27]
Origin	Synthetic; designed from the ACTH(4 to 10) fragment, with a Pro Gly Pro tail for stability[27] [4]
Class	Synthetic regulatory peptide, built from a part of ACTH that lacks its hormonal effects[27]
How it is given	Nasal drops in Russia; the nose was the only route described in the human studies the FDA reviewed[27]

Two names that are easy to confuse. Selank is a different peptide, Thr Lys Pro Arg Pro Gly Pro, and it often appears next to semax in the research and online.[6] N acetyl semax amidate is a chemically altered version of semax. In one laboratory study, adding just an acetyl group to the front of semax changed how it binds copper and meant it no longer protected nerve cells from copper damage. [7] Nothing in this guide applies to either compound, and findings about them should not be read across to semax.

§ 03

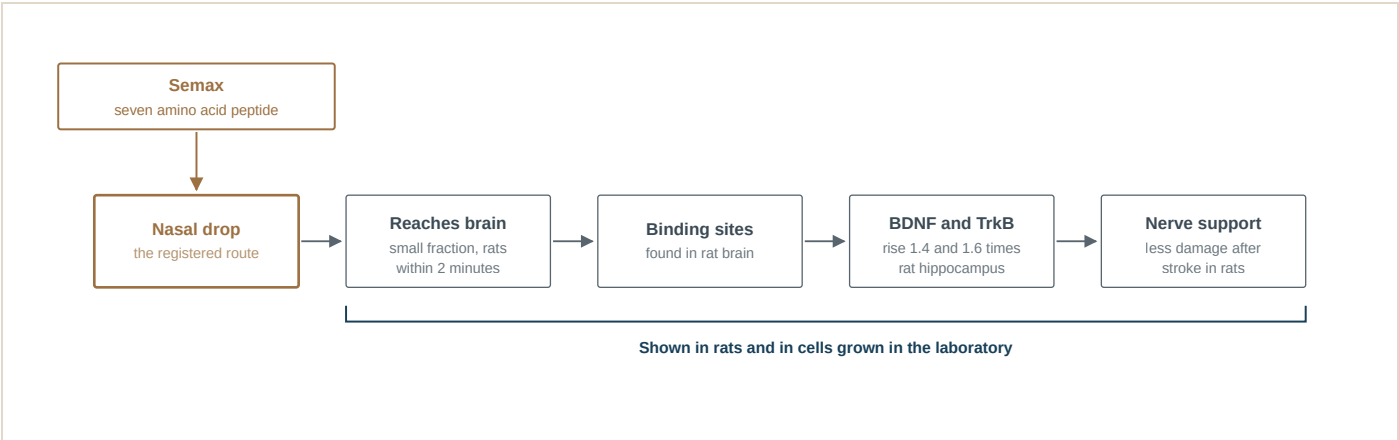
How semax works

The best studied idea is that semax raises brain derived neurotrophic factor, or BDNF. BDNF is a protein that helps nerve cells survive, form new connections and adapt, and it works through a receptor on the cell surface called TrkB. Almost all of this work was done in rats and in cells grown in the laboratory.

BDNF and its receptor (rats and cells). In support cells taken from the brains of newborn rats and grown in a dish, semax raised the messenger RNA for BDNF eightfold and for a second growth factor, NGF, fivefold within 30 minutes.[8] In living rats, a single nasal dose of 50 micrograms per kilogram raised BDNF protein in the hippocampus 1.4 times and increased activation of its TrkB receptor 1.6 times, and the treated rats learned an avoidance task better. [3] Rat brain tissue also contains specific binding sites for semax, which suggests it acts on a particular target there, although that target has not been identified. [9]

After a stroke (rats). In rats with a blocked brain artery, semax changed the activity of many genes in the injured brain, especially genes of the immune and blood vessel systems.[10] In a model where blood flow was restored after the blockage, semax damped down genes linked to inflammation and switched on genes linked to nerve signaling, the reverse of what the injury itself did. [5] In a third rat model, six days of nasal semax reduced the size of the damaged area of the cortex and protected memory. [11]

Brain chemistry and blood clotting (rodents). In rodents semax raised a marker of serotonin activity in a deep brain region, and it strengthened the release of dopamine caused by amphetamine.[12] In rats under stress it also shifted the blood toward clotting less.[13] Both of these findings are relevant to safety.



In rats, semax raises the growth factor that helps nerve cells survive and adapt. Each step has been reported in rats by the groups that developed semax.[14] [9] [3] [11] Whether the same chain operates in the human brain has not yet been measured.

In people, the evidence for this mechanism is indirect. In the 2018 stroke study, blood levels of BDNF rose in patients given semax and stayed high for the whole study period.[2] Whether that reflects what happens inside the human brain has not been measured.

KEY POINT

The BDNF findings are consistent and well described, but nearly all of them come from a small number of Russian research groups working in rats and in cell cultures, and what they mean for people has not yet been established.[27]

§ 04

What the research shows

Semax has a large published literature, and almost all of it comes from Russian groups. The human studies appear mainly in the Russian neurology journal named after S.S. Korsakov and in Russian eye journals. The full papers are in Russian, and what we can check in English is a short summary of each. We report only what those summaries say. When the FDA reviewed semax in 2026 it also noted that most of the human studies on stroke are written in Russian.[27]

What the evidence supports

In rats and in cells, semax reliably raises BDNF and related growth factors and changes how brain genes respond after a stroke, and these findings have been repeated many times by the groups that developed it.[8] [3] [10] [5] In rat models of stroke it reduced the area of damage and protected memory.[11]

What is not yet known

In the earliest stroke study, 30 patients in the first days after a stroke received semax on top of usual treatment and were compared with 80 similar patients on usual treatment alone. The authors reported some speeding of recovery, especially of movement, with daily doses of 12 mg for moderate strokes and 18 mg for severe strokes over 5 to 10 days.[15] In 2018, 110 patients in rehabilitation after stroke were divided by whether they received semax; those who did had higher blood BDNF and better scores for everyday function.[2] A 2005 study of 187 patients with poor blood flow to the brain reported clinical improvement and a lower risk of stroke and transient ischemic attacks.[16] None of these summaries describes random assignment or blinding.

Other conditions have been studied in even smaller numbers. In 27 people with motor neuron disease, an open study found that semax did not change the course of the disease or the clinical scores, though quality of life scores improved, most of all on day 10.[17] Eye specialists reported better vision measures when semax was added to treatment for diseases of the optic nerve.[18] In healthy volunteers, brain scans taken 5 and 20 minutes after a nasal dose showed changes in a resting brain network compared with placebo.[19] When the FDA reviewed the studies most relevant to stroke, migraine and facial nerve pain, it concluded that the evidence was not enough to show that semax works for those uses.[27]

HUMAN STUDIES As described in the English summaries, or by the FDA where noted

STUDY	N	DESIGN AND POPULATION	REPORTED FINDING
Gusev et al, 1997[15]	110 (30 on semax)	Comparison with usual care; acute ischemic stroke; 12 or 18 mg daily for 5 to 10 days	Some faster recovery, especially of movement
Gusev et al, 2005[16]	187	Patients with poor blood flow to the brain; design not detailed in the summary	Clinical improvement; lower risk of stroke and transient attacks; well tolerated
Gusev et al, 2018[2]	110	Rehabilitation after stroke; with or without two 10 day courses	Higher blood BDNF; faster gains in daily living scores
Serdiuk et al, 2007[17]	27	Open study; motor neuron disease; 12 mg daily in the nose, two 10 day courses	No change in disease course; better quality of life scores
Ivanikov et al, 2002[20][27]	32 (per FDA)	Hard to heal stomach ulcers; nasal drops added to standard treatment	Healed by day 14 in 89.5 percent with semax and 30.8 percent without
Lebedeva et al, 2018[19]	24 (14 on semax)	Healthy volunteers; single nasal dose or placebo	Change in a resting brain network on MRI
Koroleva et al, 1996[27]	37 (per FDA)	No control group; migraine and facial nerve pain; single nasal dose	Headache stopped in 4 of 12 with migraine; no change in typical trigeminal neuralgia

SUMMARY

Semax rests on a detailed and consistent body of rat and cell research, a long history of use as a nasal medicine in Russia, and a set of small human studies, most of them open or without random assignment, reported in Russian. The idea that it supports the brain through BDNF is well described in animals. No modern, independent, randomized and blinded trial in people has yet been done, so the human evidence remains early.

§ 05

How semax is given

No regulator in the United States has set a dose of semax for people. Where a published human study used a specific dose we describe it below; otherwise the dose, the length of a course and the timing are set by your physician. Under the federal compounding policy, pharmacies may prepare semax only as semax free base for use in the nose.[30]

Nasal drops or spray

Nearly all of the research used the nose. Semax is registered in Russia as 0.1% and 1% nasal drops, and in the human literature the FDA assessed in 2026, the nose was the only route described.[27] In the motor neuron disease study, patients took 12 mg a day of a 1% solution in the nose for two 10 day courses with a two week break.[17] In the stomach ulcer study, patients used 2 to 4 drops of a 1% solution three times a day for 10 days.[20] The stroke studies report daily amounts of 12 to

18 mg, or 6,000 micrograms a day in two 10 day courses, without naming the route in their English summaries. [15] [2] In rats, a nasal dose reached the brain within 2 minutes, though only a very small fraction of it did, and the peptide was quickly broken down. [14] This is the only route the federal policy covers. [30]

Injection under the skin

Semax is widely sold online and by some clinics as an injection. [27] The FDA's review found no study of semax given under the skin in people or in animals, and so no information on how it is absorbed this way and no safety data for it. [27] Injected semax is outside the federal compounding policy, which names the nasal route only. [30] Injection into a vein has been studied only in rats, where at most 0.01 percent of the dose reached the brain. [21]

Electrophoresis through the nose

Some Russian eye clinics deliver semax with a mild electric current applied through the nose, a technique called endonasal electrophoresis, and they have reported better vision measures with it in diseases of the optic nerve and in diabetic eye disease. [18] [22] It is a specialist technique.

COMPARING THE OPTIONS

	IN THE NOSE	UNDER THE SKIN
How it is given	Drops or spray	Small injection
Human research	SMALL STUDIES [27]	NONE FOUND [27]
Animal research	EXTENSIVE [3]	None found [27]
Dose in people	As in the studies above; set by physician	None
Federal policy	Covered, free base only [30]	Outside the policy

Your physician can help you decide whether semax fits your goals, and if so, how a course would be planned for you.

§ 06

What to expect

The human studies used short courses: 5 to 10 days in acute stroke, two 10 day courses separated by a break in stroke rehabilitation and in motor neuron disease, and 10 days in the ulcer study. [15] [2] [17] [20] What they measured were recovery scores after illness, blood BDNF, vision tests and ulcer healing, in people who were unwell.

None of this research measured whether healthy people feel sharper or more focused from day to day. Two brain scan studies in healthy volunteers found changes in brain networks within 20 minutes of a single dose, but they did not test thinking or mood. [19] [23] In the motor neuron disease study, the improvement in quality of life was largest on day 10 of the course. [17] So we suggest coming to semax with open expectations, and we are glad to hear about your own experience as it happens.

DURING A COURSE

- You will be shown how to use the nasal preparation and how to store it.
- Keep a simple note of how you feel and of the goal you wrote down at the start, so that we can look at any change together.
- Tell us about anything that feels unusual, including irritation of the nose or eyes, headaches, unusual bruising or bleeding, or any episode that could be a seizure.

§ 07

Safety

What has been published about safety is reassuring as far as it goes, but it is limited. In the 2005 study of 187 patients, the authors reported a small share of side effects and good tolerance, including in older patients.[16] When HHS adopted its policy, it noted that the human record of semax in the nose covers several hundred people with no reported harm.[30]

The FDA's 2026 review is more cautious. It found no study of how semax is absorbed and cleared in people, by any route, and most of the published human studies did not report on side effects at all. The agency's adverse event database held one report: a woman who developed eye pain and burning, and was hospitalized, after using semax nasal drops bought online.[27] The FDA did not find standard animal toxicity studies, single dose or repeated dose, or studies of effects on fertility and pregnancy.[27] It also raised three safety questions. Semax made blood less likely to clot in rats, so bleeding could be a concern for people with a bleeding risk or on blood thinners.[27 13] In rodents it strengthened the dopamine release caused by amphetamine, and its potential for misuse has not been studied.[12 27] And as with other peptides, impurities or clumping in a preparation could in principle provoke an immune reaction.[27] In a Russian study of patients recovering from oxygen deprivation of the brain, some brain wave recordings showed episodes of abnormal electrical activity after semax, and the authors advised monitoring with the first dose in those patients.[24] The source of a preparation matters too. Seized products have been found to contain semax and selank, and such research peptides are sold freely online as powders for injection and as nasal sprays.[25]

TELL YOUR PHYSICIAN BEFORE STARTING IF ANY OF THESE APPLY

- You have a bleeding disorder, or you take a blood thinner, aspirin or another medicine that affects clotting.
- You have epilepsy, have ever had a seizure, or have had a brain injury.
- You take a stimulant, such as a medicine for attention problems, or an antidepressant.
- You are pregnant, trying to conceive, or breastfeeding.
- You have a nasal condition, recent nasal surgery, or frequent nosebleeds.
- You compete in a sport that tests for drugs.
- You take any prescription medication, over the counter product or supplement. Please bring the full list.

Long term safety data on semax in people do not yet exist. The published human courses lasted days to a few weeks, and the FDA judged the clinical information too limited to describe its safety profile.[15 2 27] For that reason we review how you are doing at set points.

§ 08

Is this right for you

Semax suits some patients who are interested in brain health and comfortable with early evidence, and it is not the right starting point for others. The purpose of your consultation is to work out which group you are in.

Before we begin

- [ ] A review of your medical history, current medications and supplements
- [ ] Blood pressure, heart rate and weight
- [ ] Baseline bloodwork, so that anything we see later can be compared against a starting point
- [ ] A clear note of what you are hoping to feel, written down, so we can tell together whether it worked

If you are coming to us because of poor memory, low focus or mental fatigue, we will look for findable causes first. Sleep problems, thyroid disease, low iron or vitamin B12, depression, medication side effects and other conditions can all cause these symptoms, and finding one of those would serve you better than any peptide. If you have had a stroke or have a neurological illness, your neurologist should be part of the decision.

Reviewing your progress

We will reassess against your documented starting point after a defined course. If you are doing well, we will plan together whether and when to repeat it. If you are not, we will say so and look at other options. You are welcome to stop at any time.

> QUESTIONS TO ASK YOUR PHYSICIAN
>
> What would you expect me to notice, and by when? How will we measure whether this is working? How long is a course, and would it be repeated? What would make you recommend stopping?

§ 09

Regulatory status

Semax is not approved by the U.S. Food and Drug Administration for any indication. It has no official United States Pharmacopeia standard and is not part of any FDA approved medicine, although it is a registered medicine in Russia.[27] Since 30 October 2026, a federal enforcement discretion policy from the U.S. Department of Health and Human Services has allowed licensed pharmacies to compound semax under strict conditions.[29] [30] The conditions that matter most to you are these:

- The preparation is made on a prescription written for you personally.[29]
- Semax is its only active ingredient. Blends, such as semax combined with selank, are not covered.[29] [27]
- It is semax free base, given only in the nose. The policy names the free base; it does not name the acetate salt, and it does not cover semax by injection.[30]
- The ingredient comes from an FDA registered manufacturer and carries a certificate of analysis.[29]
- Serious side effects and quality problems are reported to the FDA.[29]

The policy is temporary. It applies until the FDA addresses semax in a final rule on the list of substances pharmacies may use in compounding, and it may be revisited. It is also not an approval. The policy itself states that compounded drugs are not FDA approved and that the FDA does not review their safety, effectiveness or quality before they are sold.[29] Prescribing a

compounded or unapproved preparation is lawful and common in American medicine, and it is a decision your physician makes with you. It does mean no regulator has reviewed this preparation for your use, and you should know that before you consent.

The policy follows earlier steps in the FDA's review. In April 2026 the FDA updated its list of bulk substances that may present significant safety risks, and semax is now shown there as withdrawn from that category.[31] In July 2026 the FDA's Pharmacy Compounding Advisory Committee considered semax and voted 8 to 5 to recommend adding it to the list of substances pharmacies may use in compounding, although FDA staff had recommended against it. [28] [27] The committee's vote is advisory. The FDA must still make its own decision and complete a formal rulemaking process.

If you compete in sport, please know that semax is not named on the 2026 World Anti Doping Agency Prohibited List, and its status under that list is not clear. Section S0 prohibits substances not covered elsewhere that have no current government approval for human use anywhere, and semax is registered in Russia. Section S2, however, also prohibits substances with a similar structure or effect to the listed peptide hormones, which include corticotrophins (section S2.2.2).[32] [27] An independent 2025 review of brain doping listed semax among substances of unclear status that may be caught by section S2 because of its likeness to tetracosactide, a synthetic ACTH. [26] Athletes should check with their anti doping organization before using it.

If you would like details about the preparation used in your treatment, please ask.

§ 10

Common questions

Is it safe to try, and what side effects should I expect?

In a 2005 study of 187 patients the authors reported a small share of side effects and good tolerance, including in older patients.[16] Most human studies did not report on side effects, the FDA found no study of how semax is handled by the human body, and its adverse event database held one report of eye pain and burning after nasal drops bought online. [27] Because animal studies showed effects on blood clotting and on dopamine, people with a bleeding risk or who take stimulants should discuss this with their physician first. [27] [12]

How soon will I notice a difference?

The studies did not measure that in healthy people. Brain scans in healthy volunteers changed within 20 minutes of a single dose, but thinking and mood were not tested.[19] In patients who were unwell, the studies measured recovery over courses of 5 to 10 days, and in one study quality of life scores improved most on day 10. [15] [17]

How is it given, and for how long?

Under the current federal policy, compounded semax is semax free base given in the nose; injected semax is outside the policy.[30] The published human studies used the nose and short courses, usually 10 days, sometimes repeated after a break. [27] [2] [17] No regulator in the United States has set a dose or a course length, so your physician sets both with you.

Can I take it together with other peptides?

The federal policy covers only preparations with a single active ingredient, so a blend that contains semax, including the semax and selank combinations sold online, falls outside it.[29] [27] If you already take other peptides or supplements, please bring the full list so your physician can review them with you.

Who should not use it?

Anyone with a bleeding disorder or on a blood thinner should talk with their physician before starting, because semax made blood less likely to clot in rats.[27] [13] The same applies to people with epilepsy or a past seizure, since abnormal brain wave activity was recorded after semax in one group of patients, and to anyone pregnant, trying to conceive or breastfeeding,

because no reproductive studies exist. [24] [27] If you take a stimulant or an antidepressant, please tell us.

What happens if I stop?

Semax was used in the research as short courses with breaks between them, so finishing a course and stopping is part of how it has been studied.[2] [17] What happens after long continuous use has not been studied. You are welcome to stop at any time; if you are thinking about it, tell us, and we will review your progress together.

How will we know if it is working?

Before you begin, we will write down what you are hoping to feel and record a starting point, including baseline bloodwork. After a defined course we will reassess against that starting point and decide together whether and when to repeat it. A simple note of how you feel during the course helps us look at any change together.

Where is a compounded medicine made, and who oversees it?

Federal law sets out two kinds of compounding. Under section 503A, a state licensed pharmacy or physician prepares a medicine for one patient against that patient's own prescription, and the state board of pharmacy carries the day to day oversight while the FDA inspects for cause and on surveillance.[33] Under section 503B, an outsourcing facility registers with the FDA, works to federal manufacturing quality standards, reports adverse events and the products it makes to the agency, and is inspected by the FDA on a risk based schedule; it may also supply a clinic directly rather than for one named patient. [34] We use both kinds, and which one prepares your medicine depends on the preparation. For semax the October 2026 federal policy applies to section 503A compounding only. [29]

Is a compounded medicine the same as an FDA approved one?

No, and the difference matters. A compounded preparation is not FDA approved, and the agency does not check its safety, effectiveness or quality before it is sold, which is why an approved product is the first choice whenever one fits your situation.[33] What a prescription from a licensed pharmacy or a registered outsourcing facility does give you is a named prescriber, a facility answerable to a state board or to the FDA, ingredients that meet federal requirements, and a route for reporting a problem. A vial bought online and labelled for research use only has none of that: the FDA treats those products as unapproved new drugs when they are meant for people, and has written to the companies selling them. [35] Please do not use one.

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32 **World Anti Doping Agency.** World Anti Doping Code International Standard: Prohibited List 2026, in force 1 January 2026.
Semax is not named. Section S0, non approved substances; section S2, introductory sentence, and S2.2.2, corticotrophins and their releasing factors. Accessed 3 November 2026. WADA

33 **U.S. Food and Drug Administration.** Compounding and the FDA: questions and answers.
States that compounded drugs are not FDA approved and that the FDA does not verify their safety, effectiveness or quality before they are marketed; describes state board and FDA oversight. Page current as of 16 September 2025. fda.gov, accessed 4 November 2026.

34 **U.S. Food and Drug Administration.** Compounding laws and policies.
Describes the conditions of sections 503A and 503B, including patient specific prescriptions, current good manufacturing practice requirements for outsourcing facilities, adverse event and product reporting, and risk based inspection. Page current as of 17 December 2024. fda.gov, accessed 4 November 2026.

35 **U.S. Food and Drug Administration.** Warning letter to Royal Peptides LLC.
Center for Drug Evaluation and Research, 24 August 2026. States that products marketed for research use only are intended to be drugs for human use and are unapproved new drugs under section 505(a) of the Federal Food, Drug, and Cosmetic Act. fda.gov, accessed 4 November 2026.

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PATIENT SIGNATURE | DATE | REVIEWING PHYSICIAN

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