Mixing Issues and Crystallization

Why peptides cloud, gel, or crystallize - and what to do about it. Updated April 2026.

If your reconstituted peptide has crystallized, gelled, or precipitated - do not inject. The active compound has come out of solution and can no longer be accurately dosed. The most common cause is using the **wrong diluent** - usually 0.9% sodium chloride mistaken for bacteriostatic water. Discard the vial and start fresh with verified bacteriostatic water.

The #1 Cause: Wrong Diluent

Patients sometimes receive 0.9% sodium chloride (normal saline) from a pharmacy when they asked for bacteriostatic water. The vials look almost identical. They are **not** interchangeable.

Property	Bacteriostatic Water	Normal Saline (0.9% NaCl)
Active	Water + 0.9% benzyl alcohol	Water + 0.9% sodium chloride
Preservative	Yes (benzyl alcohol)	None
pH	about 4.5 to 7.0	about 5.0 to 7.0 (different buffering)
Ionic strength	Low	High (154 mmol/L Na+/Cl-)
Multi-use	Up to 28 days	Single use only
Peptide compatible	Standard for research peptides	Causes precipitation

Verify before mixing. The diluent label must read **"Bacteriostatic Water for Injection, 0.9% Benzyl Alcohol."** If it says "Sodium Chloride 0.9%," "Normal Saline," or "Sterile Water for Injection" - stop. Those are different products.

Why saline causes crystallization

Peptides are charged molecules. In a high-salt environment the charges are shielded and the chains fold together, clump, and come out of solution as a gel or crystal. The change is often irreversible - even warming will not dissolve it back cleanly. Saline also has no preservative, so it cannot be safely used over multiple days.

The Three Sensitive Compounds

AOD-9604 - most sensitive

hGH fragment 176-191 with low aqueous solubility at physiological pH. Some references recommend a dilute acetic acid solution rather than plain BAC water because the acetate lowers pH and keeps the fragment in solution. Even with correct BAC water, AOD-9604 is the compound most likely to gel if handled roughly.

Diluent	Bacteriostatic water; if persistent gelling, 0.6% acetic acid in BAC water as alternative
Warning signs	Cloudy white, thick gel layer, visible floaters after refrigeration
Avoid	Saline, sterile water, shaking, direct injection on powder, temperature swings
If it gels	Discard. Do not inject.

CJC-1295 (DAC and no-DAC) - delicate

GHRH analog with limited solubility. The DAC version (long half-life) is slightly more stable; the no-DAC version (modified GRF 1-29) is especially fragile. Agitation, warm storage, repeated freeze-thaw, or incorrect diluent will cause precipitation.

Diluent	Bacteriostatic water, 0.9% benzyl alcohol
Warning signs	Cloudy solution, white particles settling, loss of clarity over time
Avoid	Saline, shaking, room-temperature exposure beyond brief use, freezing
If it precipitates	Discard. Reconstitute fresh.

NAD+ - light and pH sensitive

NAD+ is light-sensitive and has a narrow pH tolerance. It darkens (yellow to amber) if exposed to heat or light, and precipitates in aggressive pH conditions.

Diluent	Bacteriostatic water, 0.9% benzyl alcohol (for SC vial reconstitution; IV protocol uses clinical saline under medical s
Warning signs	Amber or brown color, visible particulates, loss of clear pale appearance
Avoid	Direct sunlight, warm storage, saline (for SC), aggressive shaking
If it darkens	Discard.

Decision Tree: My Vial Looks Wrong

1. **Check the diluent vial label first.**
   If it does not clearly say "Bacteriostatic Water" with benzyl alcohol, that is the cause. Discard the reconstituted peptide vial.
2. **Is the solution cloudy, gelled, or has visible crystals?**
   Do not inject. The active compound is no longer in solution. Accurate dosing is impossible.
3. **Has it changed color?**
   NAD+ turning amber, or any peptide turning yellow/brown, indicates degradation. Discard.
4. **Has the vial been at room temperature for hours, or shaken hard?**
   Even if it looks OK, the peptide may have partially degraded. Dose will be inaccurate. Reconstitute fresh.
5. **Is it past 28-30 days since reconstitution?**
   Discard. Preservative effectiveness and potency both drop off after the use-by window.

Prevention Checklist

Before you mix - verify all four:

- Diluent label reads "Bacteriostatic Water for Injection, 0.9% Benzyl Alcohol"
- Peptide vial is from a verified vendor, in date, stored correctly
- Both vials are at room temperature before mixing
- Technique: stream down the side of the vial, gentle swirl only, no shaking

During storage:

- Refrigerate at 2 to 8 C immediately after mixing
- Protect from light - original box or foil (critical for NAD+)
- Return to fridge within minutes of each draw; do not leave out
- Never freeze reconstituted peptide
- Use within 28 days; sooner for sensitive compounds

Practitioner Quick FAQ

A patient sent me a photo of a gelled vial. What do I tell them?

Do not inject. Ask what diluent they used - read the label verbatim. If it is anything other than bacteriostatic water with benzyl alcohol, that is the cause. Discard and reconstitute with verified BAC water. If the diluent was correct, the peptide is likely AOD-9604 or CJC-1295 - same fix: discard and restart.

Can I save a crystallized vial by warming it?

No. In some cases gentle warming re-dissolves a partial precipitate, but dosing accuracy is already compromised and sterility cannot be verified. Discard.

Why does normal saline come out instead of BAC water?

Compounding pharmacies stock both. Normal saline is more common (used heavily for IV preparation), so it is sometimes dispensed by default when the request is ambiguous. Always specify "bacteriostatic water for injection, with benzyl alcohol" in writing.

Is BAC water safe for everyone?

Benzyl alcohol is contraindicated in neonates and should be flagged for anyone with known benzyl alcohol sensitivity. For research use in adults it is the standard diluent.