

LETTERS TO THE EDITOR

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Injectable Peptides in Aesthetic Medicine: When Optimization Replaces Outcomes

Dear Editor:

The use of injectable peptides in aesthetic medicine has expanded rapidly in recent years, driven largely by social media, influencer-led education, and extrapolation from preclinical, cosmetic, or nonaesthetic data. These agents are frequently described using terms such as “regenerative,” “reparative,” or “optimizing,” yet their therapeutic role within elective aesthetic practice remains poorly defined.

Peptides commonly promoted for injectable aesthetic use include BPC-157, copper tripeptide-1 (GHK-Cu), and thymosin β -4 derivatives. These molecules have demonstrated biological activity in laboratory and translational models.^{1,2} More broadly, peptides represent an important and evolving class of therapeutic agents in wider medical contexts.^{1,2} In dermatology and skin biology, peptides have also been explored in relation to aging and tissue senescence.³ However, the majority of this evidence relates to topical use, wound healing, or systemic disease contexts rather than reproducible aesthetic outcomes following injection. To date, there remains a lack of robust clinical trials demonstrating durable aesthetic benefit from injectable peptide use and no validated therapeutic ranges linked to meaningful, objective aesthetic endpoints.

Despite this, peptides are often marketed as treatments rather than experimental interventions. Success is frequently framed subjectively, inferred from biochemical activity or theoretical cellular effects rather than objective aesthetic outcomes such as sustained improvement in lip contour, facial harmony, or predictable tissue behavior over time. In practice, this shifts the focus from outcome-based medicine to optimization-based intervention, where improvement is inferred from proxy measures rather than demonstrated through clinical outcomes.

This optimization logic is not unique to peptides. A similar pattern is evident in the growing interest in nicotinamide adenine dinucleotide (NAD⁺)-based therapies, which are frequently promoted on the basis of measurable biochemical change. NAD⁺ metabolism is an area

of legitimate scientific and regenerative interest; however, NAD⁺ levels vary with metabolic state, and NAD⁺ is actively consumed during inflammation and DNA repair, underscoring the limitation of biomarkers as standalone indicators of health.⁴ Elevation alone does not establish benefit, nor does it define an endpoint. The same principle applies to peptides: biological activity does not equate to clinical efficacy.

A central concern with injectable peptide use in aesthetics is the absence of validated therapeutic ranges linked to clinical outcomes. Without defined ranges tied to aesthetic benefit, normal physiology can be repeatedly reframed as suboptimal, justifying ongoing intervention. In such a model, treatment has no natural stopping point. Optimization becomes a loop rather than a finite strategy, and clinical success is perpetually deferred.

This differs fundamentally from established aesthetic interventions. Hyaluronic acid fillers, when used conservatively and anatomically, have known behavior, reversibility, a definable treatment endpoint, and decades of accumulated outcome data. Diet and exercise, often grouped under the umbrella of “biohacking,” are supported by population-level evidence and defined clinical benefit. Injectable peptides do not currently meet this standard within aesthetic medicine.

Regulatory bodies have also expressed concern regarding the compounding and marketing of unapproved peptide products. The United States Food and Drug Administration has highlighted that certain bulk drug substances used in compounding, including BPC-157, may present significant safety risks, including issues related to purity, consistency, and unsupported clinical claims.⁵ These concerns are particularly relevant in aesthetic medicine, where treatments are elective and patient tolerance for adverse outcomes is low.

Until injectable peptides are supported by high-quality clinical trials demonstrating reproducible aesthetic benefit with clearly defined endpoints and safety data, they should be regarded as experimental rather than therapeutic. Aesthetic medicine must remain anchored in outcomes, not optimization narratives. Without validated endpoints, innovation risks becoming indistinguishable

from speculation. This does not preclude future therapeutic roles for peptides in aesthetic medicine, but it underscores the need for rigorous study designs, validated endpoints, and transparent regulatory oversight before routine clinical adoption.

With regard,
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