WHITE PAPER

Dezawa MuseCell® Derived Regenerative Biologics

Translational science, mechanistic rationale, and clinical application in aesthetic medicine and plastic surgery.

FEATURING Dezawa MuseCells® · Dezawa MuseExosomes® · Dezawa MuseSecretome®

PREPARED FOR

Plastic surgeons, dermatologists, and aesthetic medicine specialists.

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FOR THE MEDICAL PROFESSIONAL

This white paper synthesizes *peer-reviewed literature*, mechanism-of-action pathways, competitive positioning, and practical implementation guidance for clinicians evaluating *Dezawa MuseCell®–derived regenerative biologics* for aesthetic and plastic surgical practice.

A publication of MuseCell Innovations®
Prepared for plastic surgeons, dermatologists,
and aesthetic medicine specialists.

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EXECUTIVE SUMMARY

An Overview of the Platform

Regenerative biologics derived from Multilineage-differentiating Stress-Enduring (Muse) cells represent a distinct and clinically advantageous platform within the rapidly converging fields of regenerative medicine and aesthetic surgery. First identified by Professor Mari Dezawa and colleagues at Tohoku University in 2010, Muse cells are endogenous, non-tumorigenic, SSEA-3-positive pluripotent stem cells that reside within the connective tissue of nearly every adult organ and exhibit a unique capacity for stress endurance, immunomodulation, and damage-directed homing. The Dezawa Aesthetics™ portfolio operationalizes this biology through three differentiated products: **Dezawa MuseCells®**, the cellular substrate; **Dezawa MuseExosomes®**, lyophilized extracellular vesicles isolated from authenticated MuseCell® cultures; and **Dezawa MuseSecretome®**, the conditioned-medium-derived bioactive complex containing the full repertoire of Muse-secreted growth factors, cytokines, and microRNAs.

Across peer-reviewed preclinical and translational studies, Muse-derived biologics have demonstrated superior trophic activity relative to conventional mesenchymal stem cell (MSC) preparations, including accelerated wound closure, enhanced angiogenesis, fibroblast activation with favorable collagen III:I remodeling, and significant attenuation of pro-inflammatory signaling. For aesthetic and plastic surgery practice, these properties translate into clinically actionable adjuncts for microneedling, fractional energy-based protocols, scar revision, alopecia management, combined regenerative skin rejuvenation, and post-procedural recovery.

Differentiation from prevailing exosome offerings—principally adipose-derived MSC products—rests on (1) sourcing from a defined, SSEA-3+ pluripotent population rather than the heterogeneous bulk MSC compartment, (2) the unique stress-tolerant cargo profile characteristic of Muse cells, and (3) the integrated three-tier product architecture allowing protocol selection across cellular, vesicular, and acellular formats. This white paper synthesizes the current peer-reviewed literature, articulates mechanism-of-action pathways, defines competitive positioning, and provides practical implementation guidance for the medical expert adopting Dezawa MuseCell®-based aesthetics.

KEY DIFFERENTIATORS

Defined SSEA-3⁺ Source Population

Isolated from a pluripotent Muse subpopulation rather than the heterogeneous bulk MSC compartment.

Stress-Tolerant Cargo Profile

Distinct biological provenance reflecting Muse-specific stress-adapted secretome.

Three-Tier Integrated Portfolio

Cellular, vesicular, and secretome formats matched to clinical context.

SECTION 01 — INTRODUCTION

Convergence of Regenerative Medicine & Aesthetic Surgery

The aesthetic and plastic surgery market is in the midst of a structural shift. Patient expectations have evolved beyond the masking of visible signs of aging toward authentic biological restoration of skin and soft-tissue quality. This shift is driven by three converging forces: the maturation of regenerative biology as a translational discipline, increasing patient sophistication regarding the biological basis of aging, and accelerated commercial availability of cell-derived biologics for in-office use. For instance, global interest in exosome-based aesthetic therapies surged more than fivefold between 2023 and 2025, with consensus literature reviews and randomized split-face trials demonstrating reproducible improvements in skin texture, hydration, elasticity, pore size, pigmentation, and wrinkle depth when stem cell–derived extracellular vesicles are paired with energy-based devices.

Despite this growth, several unmet needs persist. First, the great majority of aesthetic exosome products on the market are derived from bulk adipose-derived mesenchymal stem cells (AD-MSCs) or umbilical cord MSCs—heterogeneous populations whose secretome composition varies substantially with donor age, passage number, and isolation methodology.[1] Second, regulatory scrutiny of exosome therapeutics has tightened: the U.S. Food and Drug Administration has explicitly stated that no exosome product is currently approved for therapeutic injection, with multiple Warning Letters issued to manufacturers since 2019.[2] This places a premium on rigorously characterized topical formulations with transparent provenance and authenticated certificates of analysis. Third, the surgical community lacks a unified biologic platform that bridges intra-operative use, immediate post-procedural recovery, and longitudinal at-home or in-office maintenance—forcing practitioners to assemble multi-vendor protocols of variable quality.

As an SSEA-3+/CD105+ subpopulation comprising approximately 0.01–0.03% of adult bone marrow mononucleated cells and several percent of cultured MSC populations, Muse cells display defined pluripotency marker expression (Oct3/4, Sox2, Nanog) at moderate levels alongside low telomerase activity—a combination that confers genuine triploblastic differentiation capacity without the teratogenic risk that characterizes embryonic and induced pluripotent stem cells.[3–5] Muse cells migrate to damaged tissue via the sphingosine-1-phosphate (S1P)–S1P receptor 2 axis, integrate into recipient parenchyma, and supply tissue-protective factors over extended periods, conferring trophic activity that has been shown in head-to-head comparison to exceed that of non-Muse MSCs.[6]

This white paper is intended for plastic surgeons, dermatologists, and aesthetic medicine specialists evaluating regenerative biologics for clinical adoption. It articulates the scientific rationale for

Muse-derived products, characterizes the three-tier Dezawa Aesthetics™ portfolio, summarizes peer-reviewed evidence, and provides protocol-level guidance for integration into contemporary surgical and minimally invasive practice.

SECTION 02 — PRODUCT OVERVIEW

A Three-Tier Regenerative Platform

The Dezawa Aesthetics™ regenerative platform comprises three biologic formats, each engineered for a distinct clinical context. All three products are manufactured from authenticated, certificate-of-analysis–verified Muse cell cultures licensed under the MuseCell Innovations® program, with proprietary stress-induced enrichment and isolation protocols that produce defined SSEA-3+ populations and their derivatives.[7]

2.1 Dezawa MuseCells®

Dezawa MuseCells® is the cellular substrate of the platform: a defined, SSEA-3+/CD105+ pluripotent mesenchymal subpopulation isolated from adult mesenchymal tissue using proprietary methodology. Unlike conventional MSC preparations, MuseCells® are individually capable of triploblastic differentiation, exhibit damage-directed homing via the S1P axis, and survive within hostile inflammatory or hypoxic microenvironments where conventional MSCs typically undergo apoptosis.[8] Muse cells display low telomerase activity and downregulated Lin28 expression, and have not produced teratomas in immunocompromised animal models or clinical trials—a safety profile that distinguishes them from embryonic and induced pluripotent stem cells.[9] In aesthetic applications, MuseCells® serve as the upstream biological source for Dezawa MuseExosomes® and Dezawa MuseSecretome®.

2.2 Dezawa MuseExosomes®

Dezawa MuseExosomes® are extracellular vesicles (30–150 nm) isolated from authenticated Dezawa MuseCell® cultures. As nanoscale lipid-bilayer carriers, exosomes transmit a cell-specific cargo of microRNAs, messenger RNAs, growth factors, cytokines, lipids, and surface ligands to recipient cells, recapitulating much of the paracrine activity of the parent cell population without conferring the regulatory and logistical complexity of live-cell therapy.[10] The Muse-derived vesicle cargo is enriched in factors implicated in tissue repair—including vascular endothelial growth factor (VEGF), hepatocyte growth factor (HGF), epidermal growth factor (EGF), keratinocyte growth factor (KGF), insulin-like growth factor-1 (IGF-1), and angiopoietin-1—as well as immunomodulatory mediators (IL-10, IL-1ra, TGF-β, prostaglandin E2) and anti-fibrotic matrix metalloproteinases (MMP-1, -2, -9).[6,11] A lyophilized format affords cold-chain–independent storage stability and reconstitution at

the point of care, supporting consistent dosing and integration into a wide range of in-office protocols.

2.3 Dezawa MuseSecretome®

Dezawa MuseSecretome® is the conditioned-medium-derived acellular complex containing the full secretome of Muse cell cultures: soluble growth factors, cytokines, chemokines, lipid mediators, and nanovesicular components. Where Dezawa MuseExosomes® concentrate the vesicular fraction, Dezawa MuseSecretome® preserves the bioactive synergy of the entire paracrine output, providing a broader complement of soluble signaling molecules. These multiple different pathways, whereas protein kinase A signaling has been attributed to stemness. Proteomic analyses of the Muse cell secretome have identified enrichment of signaling networks associated with protein kinase A signaling, FXR/RXR and LXR/RXR activation, and antigen-presentation/coagulation pathways, supporting potential roles in immunomodulation, oxidative stress responses, and tissue repair, suggesting potential roles in redox regulation, immunomodulation, and tissue remodeling.[11] Clinically, MuseSecretome® is well suited to topical post-procedural recovery, microneedling-assisted delivery, and combination regimens with established energy-based modalities.

2.4 Mechanism of Action — Integrated Biological Rationale

Across all three formats, the Dezawa Aesthetics™ platform engages **four** mechanistic axes that are central to aesthetic and reconstructive outcomes: (1) immunomodulation and resolution of inflammation through cytokine balance and macrophage polarization toward a pro-resolving M2 phenotype; (2) angiogenesis via VEGF, angiopoietin-1, and HGF-mediated endothelial activation; (3) fibroblast recruitment, proliferation, and favorable extracellular matrix remodeling, with elevated collagen III:I ratios and increased MMP3:TIMP1 indicative of scarless repair; and (4) keratinocyte and adnexal support through KGF, EGF, and IGF-1 signaling.[13] The integrated three-tier product architecture allows clinicians to select the format matched to a given clinical context—cellular for advanced regenerative protocols, vesicular for targeted intracellular signal delivery and inflammation control, and secretome for broad-spectrum paracrine support.

TABLE 01 *Comparative biological characteristics of MuseCells® versus other major stem cell categories. Adapted from Wakao et al. (2018), Ossanna et al. (2023), and Fujita et al. (2025).*[3,5,6]

PROPERTY	MUSECELLS®	CONVENTIONAL MSCS	IPSCS	ESCS
Pluripotency markers (Oct3/4, Sox2, Nanog)	Moderate, endogenous	Low / undetectable	High (induced)	High
Triploblastic differentiation (single cell)	Yes (spontaneous)	No	Yes (induced)	Yes
Teratoma formation in vivo	None reported	None reported	Yes (risk)	Yes (risk)
Telomerase activity	Low	Low	High	High
Genetic manipulation required	No	No	Yes (reprogramming)	No
Damage-directed homing (S1P–S1PR2)	Yes	Limited	No	No
Tissue integration & long-term survival	Yes	Limited	Variable	Variable
Ethical considerations	None (adult-derived)	None	None	Significant

SECTION 03 — EVIDENCE & MECHANISMS

Evidence & Mechanisms of Action

This section synthesizes the peer-reviewed scientific basis for the **four** principal mechanistic axes engaged by Dezawa MuseCell®–derived biologics in aesthetic and surgical contexts. We further shed light on the superior safety profile of Dezawa MuseCell® products.

3.1 Inflammation Resolution and Immunomodulation

The transition from inflammation to proliferation is the rate-limiting step of post-procedural recovery. The Dezawa MuseSecretome® contains immunomodulatory mediators that include IL-10, IL-1ra, prostaglandin E2, transforming growth factor-β, indoleamine 2,3-dioxygenase, and granulocyte colony-stimulating factor.[6,11] In vitro and in vivo studies of MSC and Muse cell secretomes demonstrate macrophage polarization away from the pro-inflammatory M1 phenotype toward the pro-resolving M2 phenotype, suppression of T-cell proliferation, and reduction of pro-inflammatory cytokine production (TNF-α, IL-1β, IL-6).[10,14] Distinct from non-Muse MSCs, Muse cells additionally produce LIF and CRH—factors implicated in stem cell identity preservation and protection from pro-apoptotic stress within damaged microenvironments.[11] Clinically, these effects manifest as accelerated resolution of post-procedural erythema, edema, and pruritus.

3.2 Angiogenesis and Microvascular Restoration

Neovascularization is essential to wound healing, graft survival, flap viability, dermal restoration in photoaged skin, and hair growth. The Muse cell secretome contains angiogenic mediators including VEGF, angiopoietin-1, HGF, and platelet-derived growth factor (PDGF), with documented effects on endothelial tube formation, pericyte recruitment, and capillary stabilization.[6,24] Adipose-derived MSC exosomes have been shown in porcine and murine wound-healing models to enhance vascularization and tissue regeneration, with more pronounced angiogenic effects observed when combined with hyaluronic acid scaffolding.[15] For Muse-specific preparations, transplanted Muse-rich populations integrated into regenerated dermis as vascular endothelial cells in diabetic wound models, supporting direct vascular incorporation and accelerated wound healing—an effect more pronounced than in the Muse-poor cohort in this model.[16]

3.3 Fibroblast Activation and Collagen Remodeling

Dermal fibroblasts are the principal effectors of cutaneous matrix turnover and the dominant therapeutic target in skin rejuvenation. Hu et al. demonstrated that adipose-MSC exosomes promote dermal fibroblast migration and proliferation in a dose-dependent fashion, with concurrent upregulation of collagen I and III messenger RNA expression.[14] Wang et al. extended these findings, showing that exosome treatment increased the collagen III:I ratio, prevented fibroblast-to-myofibroblast differentiation, elevated TGF-β3 relative to TGF-β1, and increased MMP3 expression via ERK/MAPK pathway activation—producing a biochemical profile favorable to scarless repair and matrix remodeling rather than fibrotic scar formation.[13] Combined with hydrolyzed collagen oligopeptides, umbilical cord MSC exosomes restored proliferative capacity and increased collagen, elastin, and hyaluronic acid synthase expression in senescent human dermal fibroblasts.[21]

3.4 Keratinocyte and Epithelial Support

Re-epithelialization following ablative resurfacing or microneedling is mediated by basal keratinocyte migration and proliferation. The Muse cell secretome contains keratinocyte growth factor (KGF/FGF-7), EGF, and IGF-1—factors with established roles in keratinocyte mitogenesis and barrier restoration.[6] In an SSEA-3+ Muse cell wound-healing model, transplanted Muse cells differentiated into keratinocyte and dermal cell phenotypes within the regenerated tissue, in addition to vascular endothelial cells.[16] Beyond cellular replacement, paracrine support of host keratinocytes by MuseExosome® and MuseSecretome® cargo is consistent with the observed reductions in post-procedural downtime documented in clinical exosome studies.

3.5 Safety and Tumorigenicity Profile

A central safety advantage of Muse cell biology is the absence of teratoma formation. Muse cells have been transplanted into immunocompromised animals across multiple independent studies without teratoma development—an outcome attributable to their low telomerase activity, downregulated Lin28 expression, asymmetric division pattern, and let-7 microRNA expression that suppresses oncogenic pathways.[4,5,9] Endogenous Muse cell mobilization following acute myocardial infarction and stroke has been documented in human cohorts and correlates with improved functional outcomes, supporting the conclusion that Muse cells participate in physiological repair without pathologic proliferation. Vesicular and secretome formats, lacking nuclear material, further reduce theoretical risks associated with cell transplantation.

SECTION 04 — CLINICAL APPLICATIONS

Clinical Applications & Benefits

The clinical utility of Muse-derived biologics in aesthetic and plastic surgery rests on a multimodal mechanism of action that addresses the cellular, vascular, immunologic, and matrix-level determinants of cutaneous and soft-tissue outcomes. The following applications represent the principal use cases for which the peer-reviewed literature supports a strong mechanistic and—where available—translational rationale.

4.1 Accelerated Healing and Post-Surgical Recovery

Post-operative recovery in aesthetic surgery is governed by the orchestrated transition from inflammation to proliferation and remodeling. Numerous preclinical and clinical studies show enhanced wound healing induced by mesenchymal stem cells. However, a head-to-head comparison of Muse-poor specifically with Muse-rich MSCs in a diabetic murine ulcer model demonstrated significantly accelerated wound closure with the SSEA-3-enriched cell population—an effect attributable to upregulated growth-factor secretion and integration into regenerated dermis as vascular endothelial cells.[16]

Translated to surgical practice, these mechanisms of Dezawa MuseCells® are expected to support healing and final tissue quality after plastic surgery procedures in the face and body, both in aesthetics and reconstructive applications. Furthermore, topical post-operative application of MuseExosomes® or MuseSecretome® supports erythema, edema, and ecchymosis reduction as well as enhanced healing following procedures such as all kinds of face and neck lifts, blepharoplasty, rhinoplasty, and fat grafting.

4.2 Microneedling and Energy-Based Skin Rejuvenation

The combination of microchannel-based delivery with topical regenerative biologics is the most extensively validated current application of stem cell–derived exosomes in aesthetics. A growing body of clinical literature, including a 2025 investigator-blinded split-face non-inferiority trial of adipose-MSC exosomes versus platelet-rich plasma in radiofrequency microneedling, has reported comparable or superior outcomes for exosome-augmented protocols across investigator-rated and patient-reported endpoints.[17] In a separate split-face observational study of 28 patients, exosome-augmented microneedling demonstrated significantly greater improvement in skin texture, hydration, elasticity, and pigmentation versus microneedling alone.[18] A 2024 systematic review of 19 human studies confirmed a favorable safety profile for topical application post-microneedling, with adverse events limited to transient erythema and edema.[19]

Mechanistically, microneedling creates 0.5–2.5 mm deep microchannels that bypass the stratum corneum, allowing direct delivery of nano-sized exosomes (30–150 nm) to viable epidermis and papillary dermis. Within the dermis, MuseExosome® cargo activates fibroblast proliferation, migration, and type I and III collagen synthesis via ERK/MAPK pathway engagement, with the favorable upregulation of MMP3 and the resulting MMP3:TIMP1 ratio supporting matrix remodeling rather than fibrotic scar formation.[13,20] Suggested clinical protocols include application of reconstituted MuseExosome® or MuseSecretome® serum immediately following microneedling, RF microneedling, ablative or non-ablative fractional laser, picosecond laser, and chemical peel sessions, with continued topical application during the 48–72 hour post-procedure window.

4.3 Scar Revision and Mitigation

Scar formation reflects an imbalance between matrix deposition and degradation, with elevated collagen I:III ratios, sustained myofibroblast activation, and skewed TGF-β1:TGF-β3 signaling. In a landmark study, adipose-derived MSC exosomes administered intravenously reduced scar size in a murine incisional model, increased the collagen III:I ratio, prevented fibroblast-to-myofibroblast differentiation, and shifted the TGF-β3:TGF-β1 ratio toward the scarless phenotype—effects mediated by ERK/MAPK-dependent MMP3 upregulation.[13] The Muse cell secretome contains MMP-1, -2, and -9 along with anti-fibrotic regulators, and Muse cells exposed to damage signals upregulate keratin growth factor and angiopoietin-1.[6]

Clinical scenarios in which MuseExosome® or MuseSecretome® application offers an ideal adjunctive role include hypertrophic and atrophic acne scarring, surgical scar maturation, post-burn dermal remodeling, and revision of stretch marks (striae distensae) in conjunction with fractional energy-based or microneedling treatments. Repeated treatment cycles—typically three to five sessions at four-to-six-week intervals—are consistent with published exosome scar-revision protocols.[18]

4.4 Skin Rejuvenation, Photoaging, and Pigmentation

Photoaged dermal fibroblasts exhibit decreased collagen synthesis, accumulated reactive oxygen species, and matrix degradation. Mesenchymal stem cell exosomes have been shown to restore fibroblast function in senescent in vitro models and to drive measurable improvements in the appearance of fine lines, wrinkles, hydration, elasticity, and pore size in human studies.[21,22] A 2024 controlled clinical trial demonstrated that radiofrequency microneedling combined with topical exosomes enhanced collagen production and dermal remodeling beyond either modality alone, while a 2024 Park et al. study of 28 patients reported significant improvement in skin elasticity, hydration, and dyspigmentation with adipose stem cell exosome–augmented microneedling versus microneedling alone over 12 weeks.[18,22]

For pigmentation indications—including melasma, post-inflammatory hyperpigmentation, and solar lentigines—exosome adjunctive therapy has been associated with measurable reductions in

pigmentary lesion severity at 12 weeks on standardized 3D imaging analysis.[19] Suggested clinical use of Dezawa Aesthetics™ products in this domain centers on serial topical application post-energy-based device, with home-care continuity using physician-dispensed lyophilized formats reconstituted at point of use.

4.5 Alopecia and Scalp Regeneration

Hair restoration—particularly androgenetic alopecia and post-procedural scalp recovery—has emerged as one of the most rapidly growing applications of regenerative aesthetic biologics. Stem cell–derived exosomes engage dermal papilla cell proliferation, signal Wnt/β-catenin pathway activation, and prolong the anagen phase of the follicular cycle. The Dezawa MuseExosome® and MuseSecretome® formats, applied topically following microneedling of the scalp, are consistent with established clinical protocols for hair density and shaft caliber improvement.

TABLE 02 *Bioactive constituents of the Muse cell secretome and exosomal cargo with their cellular targets and clinical relevance. Compiled from Alessio et al. (2017), Hu et al. (2016), Wang et al. (2017), and Fujita et al. (2025).*[6,11,13,14]

BIOACTIVE COMPONENT	PRIMARY CELLULAR TARGET	AESTHETIC / SURGICAL EFFECT
VEGF, Angiopoietin-1	Endothelial cells, pericytes	Neoangiogenesis; improved graft survival; reduced ischemic flap loss
HGF, EGF, IGF-1	Keratinocytes, fibroblasts	Re-epithelialization; dermal proliferation; collagen synthesis
KGF (FGF-7)	Keratinocytes, hair follicles	Epidermal turnover; anagen-phase prolongation in alopecia
TGF-β3 (favored over TGF-β1)	Fibroblasts, myofibroblasts	Scarless repair; reduced hypertrophic scar; striae mitigation
MMP-1, -2, -3, -9	Extracellular matrix	Matrix remodeling; favorable MMP3:TIMP1; collagen III:I shift
IL-10, IL-1ra, PGE2, IDO	Macrophages, T cells	M1→M2 polarization; reduced post-procedural inflammation
microRNA cargo (e.g., miR-21, miR-126, let-7)	Multiple recipient cell types	Post-transcriptional control of inflammation, angiogenesis, senescence
BMP4, FGF18 (Muse-specific)	Stem cell niche, fibroblasts	Differentiation potential and tissue homeostasis support

SECTION 05 — COMPETITIVE LANDSCAPE

Competitive Landscape & Differentiation

The aesthetic exosome market is currently dominated by a small number of vertically integrated platforms, principally derived from adipose mesenchymal stem cells (AD-MSCs) or umbilical cord MSCs. The most clinically prominent product line is the BENEV Exosome Regenerative Complex, manufactured in collaboration with ExoCoBio (Seoul, South Korea) and produced via the ExoSCRT™ refinement process, which yields a 0.1–0.5% pure adipose-MSC exosome fraction in lyophilized format reconstituted at point of use. Additional entrants include umbilical cord MSC-derived products and platelet-derived exosome formulations, with manufacturing platforms varying in source tissue, isolation methodology, and characterization rigor.

Dezawa MuseCell®–derived biologics are differentiated from these alternatives along **five** distinct axes:

FIVE AXES OF DIFFERENTIATION

01 · Superior defined SSEA-3+ source population

Whereas ExoSCRT™ and analogous platforms isolate exosomes from the heterogeneous bulk AD-MSC compartment, Dezawa MuseExosomes® are derived from an SSEA-3+/CD105+-enriched Muse subpopulation. This subpopulation has been shown in published comparisons to express elevated pluripotency genes and to release significantly higher quantities of growth factors—particularly under hypoxic stress—relative to the SSEA-3-negative MSC fraction.[16]

02 · Stress-tolerant biological provenance

Muse cells uniquely persist under hostile conditions (hypoxia, oxidative stress, prolonged trypsin exposure) that induce apoptosis in conventional MSCs.[5] *Their secretome and vesicular cargo therefore reflect a biologically distinct stress-adapted profile, including Muse-specific upstream regulators such as BMP4 and FGF18 implicated in differentiation potential.*[11]

03 · Damage-directed homing biology

Muse cells endogenously express S1P receptor 2 and migrate toward injured tissue producing sphingosine-1-phosphate—a property documented in human stroke and acute myocardial infarction cohorts in which peripheral-blood Muse cell counts correlate with subsequent functional recovery. This biology informs the rationale for vesicular and secretome formats engineered to exploit damage-directed signaling.

04 · Three-tier integrated portfolio

Competing platforms typically offer a single product format. The Dezawa Aesthetics™ portfolio uniquely spans cellular (MuseCells®), vesicular (MuseExosomes®), and acellular soluble (MuseSecretome®) formats, allowing clinicians to match biologic format to procedure intensity and regulatory context.

05 · Provenance authentication

Dezawa MuseCells®–derived products are authenticated under the MuseCell Innovations® licensing program with certificates of analysis. Products lacking authorized COA documentation are not recognized as authentic Dezawa MuseCells®, providing a transparent quality and provenance framework that contrasts with the heterogeneous landscape of unverified exosome products documented in recent FDA Warning Letters.[2,7]

Table 3 summarizes the comparative positioning of MuseCell®–derived biologics against the principal competing exosome platforms.

TABLE 03 *Comparative positioning of Dezawa MuseCell®–derived biologics versus principal competing aesthetic exosome platforms.*

ATTRIBUTE	DEZAWA MUSEEXOSOMES® / MUSESECRETOME®	BENEV EXOSCRT™ (AD-MSC)	UC-MSC EXOSOME PRODUCTS
Source population	Defined SSEA-3+/CD105+ Muse cells	Bulk adipose-derived MSCs	Umbilical cord MSCs
Pluripotency profile	Endogenous (Oct3/4, Sox2, Nanog moderate)	Multipotent only	Multipotent only
Damage-homing biology	S1P–S1PR2 axis documented	Limited	Limited
Format options	Cellular, vesicular, secretome	Vesicular only	Vesicular only
Authenticated COA program	Yes (MuseCell Innovations®)	Manufacturer COA	Variable
Lyophilized topical format	Yes	Yes	Often yes

SECTION 06 — CLINICAL IMPLEMENTATION

Clinical Implementation

Successful adoption of Muse-derived biologics in aesthetic and plastic surgical practice requires deliberate attention to product handling, patient selection, procedural integration, and regulatory context. The following guidance reflects current best practice.

PRODUCT HANDLING AND RECONSTITUTION

Lyophilized Dezawa MuseExosome® and MuseSecretome® vials should be stored per manufacturer specification and reconstituted at the point of use with the supplied diluent under sterile technique. Reconstituted product should be applied within the manufacturer-defined window to preserve vesicular and protein bioactivity. Practitioners should verify product authenticity by certificate-of-analysis review through the MuseCell Innovations® program.

PATIENT SELECTION

Appropriate candidates include patients pursuing enhanced post-surgical healing as well as recovery acceleration following cosmetic surgery; combined microneedling, fractional ablative or non-ablative laser, RF microneedling, picosecond laser, or chemical peel protocols; scar revision following acne, surgery, or trauma; alopecia (particularly androgenetic alopecia); and overall skin quality optimization. Relative considerations include known hypersensitivity to product excipients, active cutaneous infection, and active malignancy. As topical regenerative biologics are not currently FDA-approved for therapeutic claims, all use should be framed within established cosmetic and adjunctive practice consistent with applicable jurisdictional regulation.

PROCEDURAL INTEGRATION

Recommended integration patterns include: (1) immediate post-microneedling or post-laser topical application followed by occlusive dressing where appropriate; (2) intra-operative soft tissue or wound-margin application during open aesthetic procedures; and (3) post-procedural at-home maintenance using physician-dispensed serum reconstituted at use. Treatment cycles for skin rejuvenation typically comprise three to five sessions at three-to-six-week intervals with maintenance every three to six months.

EXPECTED OUTCOMES

Patients can be counseled to anticipate measurable improvements in skin and soft tissue quality, erythema and edema duration following resurfacing procedures; visible improvements in skin tex-

ture, hydration, elasticity, and pigmentation across a 12-week treatment course; favorable scar maturation in revision protocols; and density improvement in scalp applications—understanding that individual response varies and that current evidence is strongest for topical microneedling-augmented protocols.

REGULATORY AND ETHICAL CONSIDERATIONS

Practitioners should remain attentive to evolving regulatory frameworks. Topical aesthetic application of MuseExosome® and MuseSecretome® products falls within established cosmetic practice in many jurisdictions, while injection of any exosome product remains outside FDA approval in the United States as of this writing.[2] Clinicians should ensure all marketing and patient communication accurately reflects the regulatory status of these products and avoids therapeutic claims for which clinical evidence does not yet exist.

SECTION 07 — CONCLUSION

A New Foundation for Regenerative Aesthetics

The convergence of regenerative medicine and aesthetic surgery is reshaping the standard of care across intra-operative enhancements, post-procedural recovery, scar management, skin rejuvenation, and adjunctive reconstructive practice. Muse cells—endogenous, non-tumorigenic, SSEA-3+ pluripotent stem cells discovered by Professor Mari Dezawa—offer a biologically distinct platform whose stress-tolerant, damage-directed, multimodal trophic activity is supported by more than fifteen years of peer-reviewed translational research.

Through the integrated three-tier Dezawa Aesthetics™ portfolio—Dezawa MuseCells®, MuseExosomes®, and MuseSecretome®—clinicians gain access to authenticated, COA-verified biologic formats matched to clinical context. As clinical evidence continues to accumulate and regulatory frameworks evolve, Muse-derived biologics are positioned to become a foundational element of evidence-based regenerative aesthetic practice. Practitioners interested in clinical adoption are invited to engage with the MuseCell Innovations® licensing program for product authentication, protocol guidance, and peer-reviewed scientific resources.

ENGAGE WITH THE PLATFORM

For product authentication and access to peer-reviewed scientific resources, contact MuseCell Innovations®.

MUSECELLINNOVATIONS.COM · DEZAWAAESTHETICS.COM

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