

## PRODUCT DATA SHEET

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### Resveratrol powered by Lipodisq<sup>®</sup> Sterile Solution

Nano-formulated aqueous solution: Ready-to-use

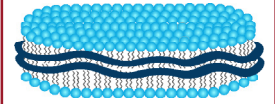
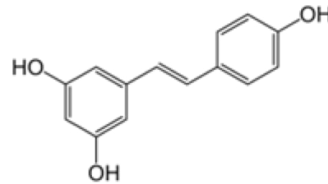
**Cat. No.:** IAX-700-105

**Lot. No.:**

|                          |  |
|--------------------------|--|
| <b>Synonyms</b>          | Trans-3,4',5-Trihydroxystilbene, trans-Resveratrol, (E)-Resveratrol, 3,4',5-Stilbenetriol in a detergent-free nano-formulation made of styrene-maleic acid lipid particles (SMALP)   |
| <b>Empirical Formula</b> | C <sub>14</sub> H <sub>12</sub> O <sub>3</sub>   |
| <b>Concentration</b>     | 1 mg/ml (0.1% w/vol)   |
| <b>Size</b>              | 1 ml   |
| <b>MW</b>                | 228.2  |
| <b>CAS</b>               | 501-36-0   |
| <b>Purity</b>            | ≥ 95% (HPLC)   |
| <b>Solution pH</b>       | 7.00 - 7.50  |
| <b>Solubility</b>        | Soluble in water, PBS, Tris and other physiological solutions as formulated in a proprietary, thermostable, aqueous lipid nanoparticulate formulation (Lipodisq <sup>™</sup> , Malvern Cosmeceutics Ltd., Malvern UK). Avoid the use of buffers with divalent ions such as Ca or Mg or pH <6.5 or >8.0, which can cause particle instability.<br>Unformulated resveratrol is soluble in DMF, DMSO or ethanol.  |
| <b>Formulation</b>       | Lipodisq <sup>™</sup> are nanosized lipid-based discoidal particles that can be manufactured to incorporate hydrophobic, poorly water-soluble compounds, such as lipids, lipoproteins and glycolipids.   |
| <b>Appearance</b>        | Light amber coloured clear aqueous solution  |
| <b>Handling</b>          | Keep sterile. Avoid skin and eye contact.  |
| <b>Activity</b>          | Cell culture tested (human macrophage cell line) (MTT).<br>Recommended starting dilution: 1:200 or higher.<br>Optimal working concentrations depend on the applications and need to be determined.<br>Published procedures using Lipodisq <sup>™</sup> formulations (Curcumin and IAXO TLR4 antagonists) <i>in vivo</i> rodent models at 3-10mg/kg. Recommended route of administration is subcutaneous (s.c.) with oral or nasal application as a possible alternative, which needs to be optimised.<br>Carrier only control: Lipodisq <sup>™</sup> Control Sterile Solution (Cat. No.: IAX-700-100). |
| <b>Shipping</b>          | Ambient  |
| <b>Storage</b>           | 2-8°C  |
| <b>Stability</b>         | 12 months after receipt (unopened and as supplied)   |
| <b>MSDS</b>              | Available on request   |

**Document No.:** IAX-700-105 | **Version:** 1.2 | **Issue Date:** 16/09/2022

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#### General Information

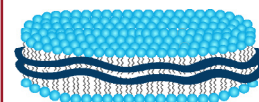
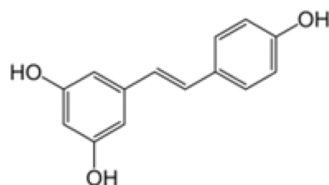
- Potent phenolic antioxidant found in grapes and red wine.
- Eicosanoid synthesis and platelet aggregation inhibitor
- Chemopreventive
- Specific inhibitor of cyclooxygenase-1 (COX-1)
- Anti-inflammatory
- Anticancer and antiproliferative compound
- Apoptosis and Autophagy inducer
- Potent SIRT1 (sirtuin 1) activator
- Senescence modulator
- Cardioprotective and neuroprotective
- Adipogenesis inhibitor

#### Resveratrol References

- [1] *Can Resveratrol-Inhaled Formulations Be Considered Potential Adjunct Treatments for COVID-19?* Rossi GA, et al. *Front. Immunol.* (2021); 12:670955
- [2] *Role of Resveratrol in Prevention and Control of Cardiovascular Disorders and Cardiovascular Complications Related to COVID-19 Disease: Mode of Action and Approaches Explored to Increase Its Bioavailability.* Gligorijević N, et al. *Molecules* (2021); 26:2834
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- [6] *COVID-19: immunopathology, pathophysiological mechanisms, and treatment options.* Van Eijk LE, et al. *J. Pathol.* (2021); 254:307
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- [9] *Resveratrol as an Adjunctive Therapy for Excessive Oxidative Stress in Aging COVID-19 Patients.* Liao M-T, et al. *Antioxidants* (2021); 10:1440
- [10] *A comprehensive guide to the pharmacologic regulation of angiotensin converting enzyme 2 (ACE2), the SARS-CoV-2 entry receptor.* Murat Oz M, et al. *Pharmacol. Ther.* (2021); 221:107750
- [11] *COVID-19: Immunology, Immunopathogenesis and Potential Therapies.* Bhardwaj A, et al. *Int. Rev. Immunol.* (2022); 41:171
- [12] *Molecular Mechanisms of Possible Action of Phenolic Compounds in COVID-19 Protection and Prevention.* Gligorijevic N, et al. *Int. J. Mol. Sci.* (2021); 22:12385
- [13] *Therapeutic Potential of Resveratrol in COVID-19-Associated Hemostatic Disorders.* Giordo R, et al. *Molecules* (2021); 26:856

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#### Lipodisq™ Technology

- A nanoparticle (11-40nm) drug delivery system comprising a discoidal phospholipid bilayer membrane stabilised by a chaperone molecule annulus.
- Internal properties of the phospholipid membrane support the disposition and stabilisation of drug molecule candidates and preserve the native conformation of membrane molecules.
- The resulting encapsulated actives are rendered water-soluble and specialised for intra-cellular penetration/delivery via endosomal uptake mechanisms.
- Lipodisq™ solutions show a good safety profile and are suitable for *in vitro* and *in vivo* investigations.
- For a customizable biodegradable Lipodisq™ version with a higher concentration of actives or an alternative lipid option, contact Innaxon.

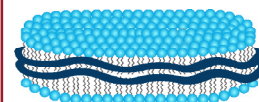
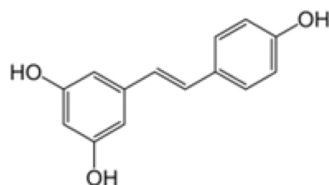
| Component                 | Concentration | CAS #      | EC #      |
|---------------------------|---------------|------------|-----------|
| Water (sterile)           | QS            | 7732-18-5  | 231-791-2 |
| Poly(styrene maleic acid) | 25mg/ml       | 26762-29-8 | 607-996-1 |
| Lecithin                  | 9mg/ml        | 92128-87-5 | 295-786-7 |
| Resveratrol               | 1 mg/ml       | 501-36-0   | 610-504-8 |

#### Lipodisq™ References

- [1] *Mechanisms of Formation, Structure, and Dynamics of Lipoprotein Discs Stabilized by Amphiphilic Copolymers: A Comprehensive Review.* Orekhov PS, et al. *Nanomaterials* (2022); 12:361
- [2] *Applications of Synthetic Polymer Discoidal Lipid Nanoparticles to Biomedical Research.* Tanaka M. *Chem. Pharm. Bull.* (2022); 70:507
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- [5] *Effects of charged lipids on the physicochemical and biological properties of lipid–styrene maleic acid copolymer discoidal particles.* Tanaka M, et al. *Biochim. Biophys. Acta. Biomembr.* (2020); 1862:183209
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- [7] *The styrene–maleic acid copolymer: a versatile tool in membrane research.* Dörr JM, et al. *Eur. Biophys. J.* (2016); 45:3
- [8] *Reconstitution of membrane proteins: a GPCR as an example.* Goddard AD, et al. *Methods Enzymol.* (2015); 556:405

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- [10] Characterizing the structure of lipodisq nanoparticles for membrane protein spectroscopic studies. Zhang R, et al. *Biochim. Biophys. Acta.* (2015); 1848:329
- [11] Advances in the use of nanoscale bilayers to study membrane protein structure and function. Malhotra K and Alder NN. *Biotechnol. Genet. Eng. Rev.* (2014); 30:79
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- [13] Detergent-free formation and physicochemical characterization of nanosized lipidpolymer complexes: lipodisq. Orwick MC, et al. *Angew. Chem.* (2012); 51:4653
- [14] Detergent-free incorporation of a seven-transmembrane receptor protein into nanosized bilayer lipodisq particles for functional and biophysical studies. Orwick-Rydmark M, et al. *Nano Lett.* (2012); 12:4687
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- [18] Responsive Hydrophobically Associating Polymers: A Review of Structure and Properties. Tonge, SR and Tighe, BJ. *Adv. Drug Deliv. Rev.* (2001); 53:109

Lipodisq™ technology is covered by one or more of the following patents owned by Malvern Cosmeceutics Limited: AU2006253886, CA2611144, CN101184473B, EP1890675, GB2426703, IN261468, JP5142898, US8623414 and WO/2021/005340A1 pending.

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