

PRODUCT DATA SHEET

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Retinoic Acid powered by Lipodisq™ Sterile Solution

Nano-formulated aqueous solution: Ready-to-use

Cat. No.: IAX-700-109

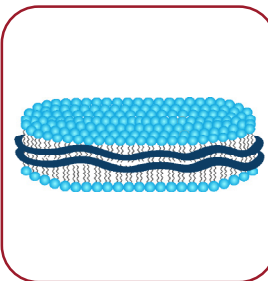
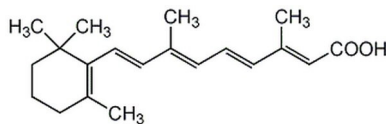
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Synonyms	all-trans-3,7-Dimethyl-9-(2,6,6-trimethyl-1-cyclohexen-1-yl)-2,4,6,8-nonatetraenoic Acid, Tretinoin, all-trans-Retinoic acid (ATRA), Vitamin A acid in a detergent-free nano-formulation made of styrene-maleic acid lipid particles (SMA-Lipid Particles)
Empirical Formula	C ₂₀ H ₂₈ O ₂
Concentration	1 mg/ml (0.1% w/vol)
Size	1 ml
MW	300.44
CAS	302-79-4
Purity	≥ 95% (HPLC)
Solution pH	7.00 - 7.50
Solubility	Soluble in water, PBS, Tris and other physiological solutions as formulated in a proprietary, thermostable, aqueous lipid nanoparticulate formulation (Lipodisq™, 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. Unformulated Retinoic Acid is soluble in Chloroform, DMSO or ethanol. Insoluble in water.
Formulation	Lipodisq™ are nanosized lipid-based discoidal particles that can be manufactured to incorporate hydrophobic, poorly water-soluble compounds, such as lipids, lipoproteins and glycolipids.
Appearance	Colourless clear aqueous solution
Handling	Protect from light! Keep sterile. Avoid skin and eye contact.
Activity	Cell culture tested (human macrophage cell line) (MTT). Recommended starting dilution: 1:200 or higher. Optimal working concentrations depend on the applications and need to be determined. Published procedures using Lipodisq™ formulations (Curcumin and IAXO TLR4 antagonists) <i>in vivo</i> rodent models at 3-10 mg/kg. Recommended route of administration is subcutaneous (s.c.) with oral or nasal application as a possible alternative, which needs to be optimised. Carrier only control: Lipodisq™ Control Sterile Solution (Cat. No.: IAX-700-100).
Shipping	Ambient
Storage	2-8°C
Stability	In its unopened original vial, the product is stable for at least 12 months. Once the glass vial is opened, or if aliquoted into sterile vials under sterile conditions, the product remains stable for an additional 2 months at 2-8°C. Pre-diluted, sterile aqueous solutions are stable for at least 24 hours when stored at 2-8°C.
MSDS	Available on request

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General Information

- Vitamin A is a fat-soluble micronutrient necessary for the growth of healthy skin and hair. However, both too little and too much vitamin A has deleterious effects. All-trans-retinoic acid (ATRA) and retinal are the main active metabolites of vitamin A. Retinoic acid dose-dependently regulates hair follicle stem cells, influencing the functioning of the hair cycle, wound healing, and melanocyte stem cells. Retinoic acid also influences melanocyte differentiation and proliferation in a dose-dependent and temporal manner. Levels of retinoids decline when exposed to ultraviolet irradiation in the skin.
- All-trans-retinoic acid (ATRA) is effective for preventing cancer and treating skin diseases and acute promyelocytic leukaemia (APL). These pharmacological effects of ATRA are mainly mediated by retinoid X receptors (RXRs) and retinoic acid receptors (RARs). These included two families of receptors, the RAR isotypes (α , β , and γ) along with three RXR isotypes (α , β , and γ), which bind as RXR/RAR heterodimers to cis-acting response elements of RA target genes to generate a high degree of complexity.
- Retinoic acid is used in the treatment of psoriasis, ichthyosis, follicular keratosis, acne, lichen planus, verrucous epidermal nevus, impetigo, vitiligo, lichen psoriasis, the face of pityriasis alba.

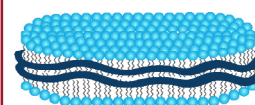
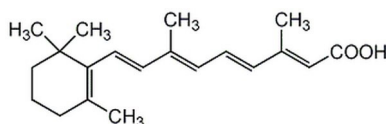
Retinoic Acid References

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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
Retinoic Acid	1 mg/ml	302-79-4	206-129-0

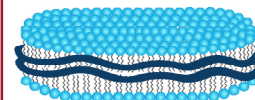
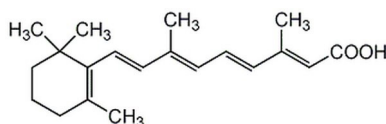
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Lipodisq™ technology is covered by one or more of the following patents owned by Malvern Cosmeceutics Limited: AU2006253886, CA2611144, CN101184473B, EP1890675, GB2426703, IN261468, JP5142898, US8623414 and WO/2021/005340A1 pending.

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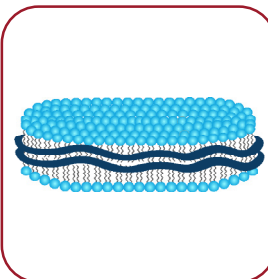
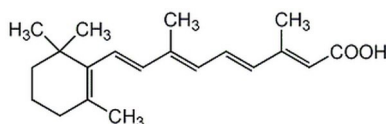
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Related Powered by Lipodisq™ Products for Nano-formulated Drug Delivery

IAX-700-100	Lipodisq™ Control Sterile Solution
IAX-700-101	Curcumin Lipodisq™ Sterile Solution
IAX-700-102	Melatonin Lipodisq™ Sterile Solution
IAX-700-103	Metformin Lipodisq™ Sterile Solution
IAX-700-104	Oxyresveratrol Lipodisq™ Sterile Solution
IAX-700-105	Resveratrol Lipodisq™ Sterile Solution
IAX-700-106	Umifenovir Lipodisq™ Sterile Solution
IAX-700-107	Dexamethasone Lipodisq™ Sterile Solution
IAX-700-108	Ambroxol Lipodisq™ Sterile Solution
IAX-700-109	Retinoic Acid Lipodisq™ Sterile Solution
IAX-700-201	Lipodisq™ Styrene:Maleic Acid Copolymer 1:1 [SMA-100]
IAX-700-202	Lipodisq™ Styrene:Maleic Acid Copolymer 2:1 [SMA-200]
IAX-700-203	Lipodisq™ Styrene:Maleic Acid Copolymer 3:1 [SMA-300]
IAX-700-204	Lipodisq™ Styrene:Maleic Acid Copolymer 4:1 [SMA-400]
IAX-700-400	DMPC (1,2-Dimyristoyl-sn-glycero-3-phosphocholine) (14:0 PC)

Endotoxin-free and Sterile Buffers and Related Products

IAX-900-001	PBS Endotoxin-free (sterile)
IAX-900-001DC	PBS Endotoxin-free (sterile) [For Nano-formulated Drug Analysis]
IAX-900-002	ddWater Endotoxin-free (sterile)
IAX-900-002DC	ddWater Endotoxin-free (sterile) [For Nano-formulated Drug Analysis]
IAX-900-003	Physiological Saline [Sodium Chloride 0.9% Endotoxin-free] (sterile)
IAX-900-003DC	Physiological Saline [Sodium Chloride 0.9% Endotoxin-free] (sterile) [For Nano-formulated Drug Analysis]
IAX-900-004	PBS with EDTA Endotoxin-free (sterile)
IAX-900-005	TRIS with EDTA [TE Buffer] (100x) Endotoxin-free (sterile)
IAX-900-006	EDTA (400mM) Endotoxin-free (sterile)
IAX-900-007	HEPES Buffer (500mM) Endotoxin-free (sterile)
IAX-900-008	DNA Loading Buffer with TRIS and EDTA (6x) (Blue)
IAX-900-009	HEPES Buffer (50mM) with NaCl [Sodium Chloride] (150mM) Endotoxin-free (sterile)
IAX-900-010	NaCl [Sodium Chloride] (1.5M) Endotoxin-free (sterile)
IAX-900-011	TRIS Buffer (1.5M) Endotoxin-free (sterile)
IAX-900-012	TRIS Buffer (30mM) with NaCl [Sodium Chloride] (150mM) Endotoxin-free (sterile)
IAX-900-013	PBS with Magnesium and Calcium Endotoxin-free (sterile)
IAX-900-014	ddWater with 0.9% Benzyl Alcohol [Bacteriostatic Water] Endotoxin-free (sterile)

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