

IRON OXIDE-BASED SUPERPARAMAGNETIC CONTRAST AGENTS

Molday ION™ product line is a family of iron oxide-based superparamagnetic contrast reagents designed to label cells and mark the vascular space. These MRI contrast reagents have a colloidal size of 30-50 nm and are classified as darkening agents acting through the T2 relaxation process.

Molday ION comes with many chemical surfaces and is presented below organized by applications. These applications are (1) Blood pool agent for vascular and functional imaging, (2) Cell labeling, (3) Functional chemistry for conjugations, (4) Receptor targeting, (5) Fluorescent labeled iron oxides, (6) Fixing and staining.

BioPAL can also prepare custom nano-iron oxides. *Please Inquire!*

NOT FOR HUMAN USE.

Application 1: Vascular and Functional Imaging

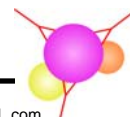
<u>Catalog Number</u>		
CL-30Q02-2	Molday ION 2.0 ml of 30 nm iron-based superparamagnetic contrast agent packaged in a 2 ml sealed serum bottle. 10 mg Fe/ml having a zeta potential of ~ -5mV. As an intravascular contrast agent, Molday ION has a blood half-life of several hours and can be used in a wide range of cardiovascular research applications. <u>Applications:</u> MRI vascular/functional imaging, Blood pool agent, EM, Magnetic cell-sorting. <u>References:</u> 1 and 2	\$ 275.00
CL-30Q02-7	Molday ION Carboxyl 2.0 ml of 20 nm iron-based superparamagnetic contrast agent containing carboxyl groups packaged in a 2 ml sealed serum bottle. 10 mg Fe/ml having a zeta potential of ~ -20mV. <u>Applications:</u> MRI vascular/functional imaging, EM, Magnetic cell-sorting.	\$ 275.00
CL-30Q02-6	Molday ION (-) 2.0 ml of 30 nm iron-based superparamagnetic contrast agent having a negative colloid surface packaged in a 2 ml sealed serum bottle. 10 mg Fe/ml having a zeta potential of ~ -15mV. Molday ION (-) is formulated for labeling cells using Poly-L-Lysine. <u>Applications:</u> Cell labeling, Cell labeling with MRI tracking, EM.	\$ 300.00
CL-00-01	Poly-L-Lysine 1.0 ml poly-l-lysine (10 mg/ml) packaged in a 2 ml sealed serum bottle. <u>Applications:</u> For use with Molday ION (-) for the application of labeling cells The procedure for labeling Poly-L-Lysine onto CL-30Q02-6 is provided as a separate PDF download on BioPAL's web site – Application Note #1 .	\$ 60.00
CL-30Q02-6C	Molday ION Carboxyl Terminated 2.0 ml of 30 nm iron-based superparamagnetic contrast agent containing carboxyl groups packaged in 2 ml sealed serum bottle. 2.5 mg Fe/ml, having a zeta potential of ~ -35 mV. <u>Applications:</u> MRI, EM, Magnetic cell-sorting, Cell targeting, Conjugation.	\$ 395.00
CL-30Q02-CA	Molday ION Carboxyl/Amine Terminated 2.0 ml of 30 nm iron-based superparamagnetic contrast agent containing amine and carboxyl groups designed to approximate the surface of a protein packaged in a 2 ml serum bottle. 5 mg Fe/ml, having a zeta potential of ~ +4 mV. <u>Applications:</u> MRI, EM, Magnetic cell-sorting, Cell labeling.	\$ 475.00



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Application 2: Cell Labeling

<u>Catalog Number</u>		\$	
CL-50Q02-6A	Molday ION C6Amine 2.0 ml of 35 nm iron-based superparamagnetic contrast agent with amine groups separated by a 6 carbon spacer packaged in a 2 ml sealed serum bottle. 5 mg Fe/ml having a zeta potential of ~ +48 mV. A suggested procedure for labeling cells is provided as a PDF download on BioPAL's web site. <u>Applications:</u> Cell labeling, Cell labeling with MRI tracking, Drug delivery, Theranostics. For additional information, please review Application Note #7 on BioPAL Web Site.	475.00	
CL-50Q02-6A-50	Molday ION Rhodamine B 2.0 ml of 35 nm rhodamine B labeled iron-based superparamagnetic contrast agent packaged in a 2 ml sealed serum bottle. 2 mg Fe/ml having a zeta potential of ~ +31 mV. A suggested procedure for labeling cells is provided as a PDF download on BioPAL's web site. PDF downloads depicting labeled cells, as well as presented posters, is also provided. <u>Applications:</u> Cell labeling, Cell labeling with MRI tracking, Live cell imaging (<i>in vitro</i>), Drug delivery, Theranostics, Fluorescent detection. For additional information, please review Application Note #3 on BioPAL Web Site.	450.00	
CL-50Q02-6A-51	Molday ION EverGreen™ 2.0 ml of 35 nm EverGreen labeled iron-based superparamagnetic contrast agent packaged in a 2 ml sealed serum bottle. 2 mg Fe/ml having a zeta potential of ~ +31 mV. Labeled cells may be visualized using a standard fluorescein filter set. Molday Ion EverGreen has an excitation and emission maxima at 498 nm and 526 nm, respectively. <u>Applications:</u> Cell labeling, Cell labeling with MRI tracking, Live cell imaging (<i>in vitro</i>), Drug delivery, Theranostics, Fluorescent detection. For additional information, please review Application Note #3 on BioPAL Web Site.	450.00	
CL-50Q02-6A-52	Molday ION Coumarin™ 2.0 ml of 35 nm Coumarin labeled iron-based superparamagnetic contrast agent packaged in a 2 ml sealed serum bottle. 2 mg Fe/ml having a zeta potential of ~ +30 mV. Labeled cells may be visualized using a standard DAPI filter set. Molday Ion Coumarin has an excitation and emission maxima at 356 nm and 456 nm, respectively. <u>Applications:</u> Cell labeling, Cell labeling with MRI tracking, Live cell imaging (<i>in vitro</i>), Drug delivery, Theranostics, Fluorescent detection. For additional information, please review Application Note #3 on BioPAL Web Site.	450.00	
CL-30Q02-6	Molday ION (-) 2.0 ml of 30 nm iron-based superparamagnetic contrast agent having a negative colloid surface packaged in a 2 ml sealed serum bottle. 10 mg Fe/ml having a zeta potential of ~ -15mV. Molday ION (-) is formulated for labeling cells using Poly-L-Lysine. <u>Applications:</u> Cell labeling, Cell labeling with MRI tracking, EM.	300.00	
CL-00-01	Poly-L-Lysine 1.0 ml poly-l-lysine (10 mg/ml) packaged in a 2 ml sealed serum bottle. <u>Applications:</u> For use with Molday ION (-) for the application of labeling cells The procedure for labeling Poly-L-Lysine onto CL-30Q02-6 is provided as a separate PDF download on BioPAL's web site – Application Note #1 .	60.00	
CL-50Q02-71	Molday ION Spermidine 1.0 ml of 40 nm iron-based superparamagnetic contrast agent conjugated with spermidine packaged in a 2 ml sealed serum bottle. 1 mg Fe/ml having a zeta potential of ~ +35mV. A suggested procedure for labeling cells is provided as a PDF download on BioPAL's web site (Application Note #5). <u>Applications:</u> Cell labeling, Cell labeling with MRI tracking, EM, Magnetic cell-sorting, Drug delivery, Theranostics.	475.00	



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Application 3: Functional Chemistry for Conjugations

Molday ION Containing Reactive Amines

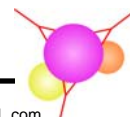
CL-50Q02-6A	Molday ION C6Amine\$ 475.00 2.0 ml of 35 nm iron-based superparamagnetic contrast agent with amine groups separated by a 6 carbon spacer packaged in a 2 ml sealed serum bottle. 5 mg Fe/ml having a zeta potential of ~ +48 mV. A suggested procedure for labeling cells is provided as a PDF download on BioPAL's web site, see Application Note #7 . <u>Applications:</u> Conjugation with bifunctional agents, Click chemistry, NHS esters, Isothiocyanates.
CL-30Q02-CA	Molday ION Carboxyl/Amine Terminated\$ 475.00 2.0 ml of 30 nm iron-based superparamagnetic contrast agent containing amine and carboxyl groups designed to approximate the surface of a protein packaged in a 2 ml serum bottle. 5 mg Fe/ml, having a zeta potential of ~ +4 mV. <u>Applications:</u> Conjugation with bifunctional agents, Click chemistry, NHS esters, Isothiocyanates.
CL-50Q02-15	Molday ION Aromatic Amine\$ 395.00 2.0 ml of 40 nm iron-based superparamagnetic contrast agent containing aromatic amine groups packaged in a 2 ml sealed serum bottle. 2.5 mg Fe/ml having a zeta potential of ~ +48 mV. This nanoparticle is designed not to independently bind to or be internalized by cells. Therefore, cell labeling is achieved exclusively <i>via</i> your conjugated ligand. A suggested procedure for conjugation is provided as a PDF download file on BioPAL's web site (Application Note 6). <u>Applications:</u> After activation to an isothiocyanate this nanoparticle will react with amine containing compounds.

Molday ION Containing Reactive Carboxyls

CL-30Q02-6C	Molday ION Carboxyl Terminated\$ 395.00 2.0 ml of 30 nm iron-based superparamagnetic contrast agent designed for conjugating a ligand, peptide, antibody, or protein using water soluble carbodiimide packaged in a 2 ml sealed serum bottle. 2.5 mg Fe/ml, having a zeta potential of ~ -35 mV. This nanoparticle is designed not to independently bind to or be internalized by cells. Therefore, cell labeling is achieved exclusively <i>via</i> your conjugated ligand. A suggested procedure for conjugation of amine containing compounds is provided as a PDF download on BioPAL's web site (Application Note #5). <u>Applications:</u> Conjugation of amine containing compounds using water soluble carbodiimide, MRI, EM, Drug delivery, Theranostics, Magnetic cell-sorting.
CL-30Q02-CA	Molday ION Carboxyl/Amine Terminated\$ 475.00 2.0 ml of 30 nm iron-based superparamagnetic contrast agent containing amine and carboxyl groups designed to approximate the surface of a protein packaged in a 2 ml serum bottle. 5 mg Fe/ml, having a zeta potential of ~ +4 mV. <u>Applications:</u> Conjugation with bifunctional agents, Click chemistry, NHS esters, Isothiocyanates.

Molday ION Containing Other Reactive Groups

CL-30Q02-10	Molday ION Aldehyde\$ 395.00 2.0 ml of 30 nm iron-based superparamagnetic contrast agent designed for conjugating amine containing ligand packaged in a 2 ml sealed serum bottle. 2.5 mg Fe/ml having a zeta potential of ~ -35 mV. A suggested procedure for labeling cells is provided as a PDF download on BioPAL's web site. <u>Applications:</u> Labeling liposomes, preparation of ferrosomes, Cell labeling. <u>References:</u> 3 and 4
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Application 4: Receptor Targets

<u>Catalog Number</u>		
CL-50Q02-71	Molday ION Spermidine	\$ 475.00
	1.0 ml of 40 nm iron-based superparamagnetic contrast agent conjugated with spermidine packaged in a 2 ml sealed serum bottle. 1 mg Fe/ml having a zeta potential of ~ +35mV. CL-50Q02-71 enters cells via the polyamine receptor. <u>Applications:</u> Cell labeling, Cell labeling with MRI tracking, EM, Magnetic cell-sorting, Drug delivery, Theranostics.	
MR-7100	PolyGalactoseMagnetite™	\$ 375.00
	Packaged as 200 mg powder in a 10 ml sealed serum bottle. For additional information, please see Application Note #4 .	

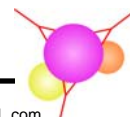
Application 5: Fluorescent Labeled Iron Oxides

<u>Catalog Number</u>		
CL-50Q02-6A-50	Molday ION Rhodamine B	\$ 450.00
	2.0 ml of 35 nm rhodamine B labeled iron-based superparamagnetic contrast agent packaged in a 2 ml sealed serum bottle. 2 mg Fe/ml having a zeta potential of ~+31 mV. A suggested procedure for labeling cells is provided as a PDF download on BioPAL's web site (Application Note #3). PDF downloads depicting labeled cells, as well as presented posters, is also provided. <u>Applications:</u> Cell labeling, Cell labeling combined with MRI and fluorescent tracking, EM, Magnetic cell-sorting, Drug delivery, Theranostics.	
CL-50Q02-6A-51	Molday ION EverGreen™	\$ 450.00
	2.0 ml of 35 nm EverGreen labeled iron-based superparamagnetic contrast agent packaged in a 2 ml sealed serum bottle. 2 mg Fe/ml having a zeta potential of ~+31 mV. Labeled cells may be visualized using a standard fluorescein filter set. Molday Ion EverGreen has an excitation and emission maxima at 498 nm and 526 nm, respectively. <u>Applications:</u> Cell labeling, Cell labeling combined with MRI and fluorescent tracking, EM, Magnetic cell-sorting, Drug delivery, Theranostics.	
CL-50Q02-6A-52	Molday ION Coumarin™	\$ 450.00
	2.0 ml of 35 nm Coumarin labeled iron-based superparamagnetic contrast agent packaged in a 2 ml sealed serum bottle. 2 mg Fe/ml having a zeta potential of ~ +30 mV. Labeled cells may be visualized using a standard DAPI filter set. Molday Ion Coumarin has an excitation and emission maxima at 356 nm and 456 nm, respectively. <u>Applications:</u> Cell labeling, Cell labeling with MRI tracking, Live cell imaging (<i>in vitro</i>), Drug delivery, Theranostics, Fluorescent detection. For additional information, please review Application Note #3 on BioPAL Web Site.	



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CL-50Q02-6C-50	Molday ION Rhodamine B Carboxyl\$ 450.00 2.0 ml of 35 nm rhodamine B labeled iron-based superparamagnetic contrast agent designed for conjugating a ligand, peptide, antibody, or protein using water soluble carbodiimide packaged in a 2 ml sealed serum bottle. 2 mg Fe/ml having a zeta potential of ~ -35 mV. This nanoparticle is designed not to independently bind to or be internalized by cells. Therefore, cell labeling is achieved exclusively via your conjugated ligand. A suggested procedure for conjugation of amine containing compounds is provided as a PDF download on BioPAL's web site (Application Note #5). <u>Applications:</u> Conjugation of amine containing compounds using water soluble carbodiimide, MRI, EM, Drug delivery, Theranostics, Magnetic cell-sorting.
CL-50Q02-CA-50	Molday ION Carboxyl/Amine Rhodamine B\$ 450.00 2.0 ml of 50 nm rhodamine B labeled iron-based superparamagnetic contrast agent containing amine and carboxyl groups designed to approximate the surface of a protein packaged in a 2 ml sealed serum bottle. 2 mg Fe/ml having a zeta potential of ~ +4 mV. <u>Applications:</u> MRI, EM, Fluorescent detection, Magnetic cell-sorting.



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Application 6: Helpful Products for Staining and Fixing Iron-Labeled Cells

Catalog Number

CL-01-50	Prussian Blue Reagent Pack\$ 65.00 Pack consists of Reagent A (50 ml) and Reagent B (50 ml) plus phosphate buffered saline (100 ml). BioPAL's Prussian Blue Reagent Pack has been formulated for visualizing cells labeled with Molday ION family of products. It can also be used for visualizing cells labeled with other iron containing compounds, such as ferritin. Applications: For visualizing iron-labeled cells. The procedure for Prussian Blue staining of iron-labeled cells is provided as a separate PDF download on BioPAL's web site (Application Note #7).
CL-01-51	PBS++\$ 45.00 Phosphate buffered saline supplemented with (0.1 g/L CaCl ₂) and (0.1 g/L MgCl ₂). Amount 100 ml, Store at 4°C. Applications: Cell Fixation. The procedure for fixing cells is provided as a separate PDF download on BioPAL's web site (Application Note #3).
CL-01-52	25% Glutaraldehyde\$ 30.00 Amount 5 ml, Store at 4°C. Applications: Cell Fixation. The procedure for fixing cells is provided as a separate PDF download on BioPAL's web site (Application Note #6).
CL-01-53	40% Formalin\$ 30.00 Amount 5 ml, Store at 4°C. Applications: Cell Fixation . The procedure for fixing cells is provided as a separate PDF download on BioPAL's web site (Application Note #6).

References

1. JuanYin J, Tracy K, Zhang L, Munasinghe J, Shapiro E, Koretsky A, *et al.*: Noninvasive imaging of the functional effects of anti-VEGF therapy on tumor cell extravasation and regional blood volume in an experimental brain metastasis model. *Clin Exp Metastasis* (2009) **26**; 403-14.
2. Lee J, Hirano Y, Fukunaga M, Silva A, and Dyun, JH: Investigating the sources of phase contrast: iron oxide nanoparticle study to exclude deoxyhemoglobin as a major source for the gray/white matter phase contrast. *NeuroImage* (2009) **47** Supplement 1, S39-S41.
3. Bogdanov AA, Jr., Martin C, Weissleder R, Brady TJ: Trapping of dextran-coated colloids in liposomes by transient binding to aminophospholipid: preparation of ferrosomes. *Biochim Biophys Acta* (1994) **1193**; 212-8.
4. Groman EV, Yang M, Reinhardt, CP, Weinberg, JS, Vaccaro, DE: Polycationic Nanoparticles: (1) Synthesis of a Polylysine-MION Conjugate and its Application in Labeling Fibroblasts. *J of Cardiovasc Trans Res* (2009) **2**; 30-38.

