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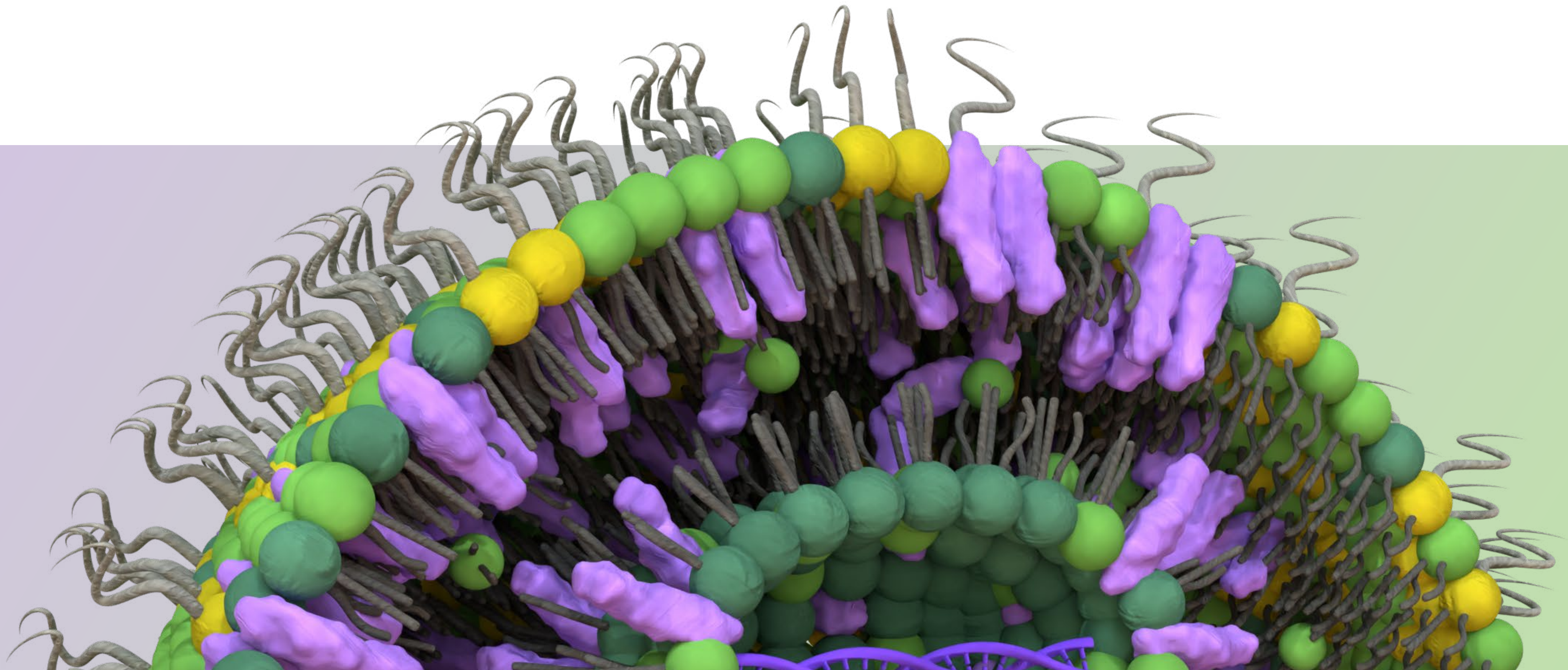
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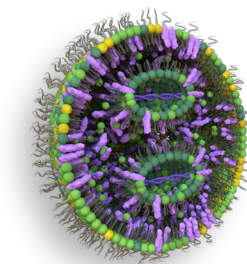
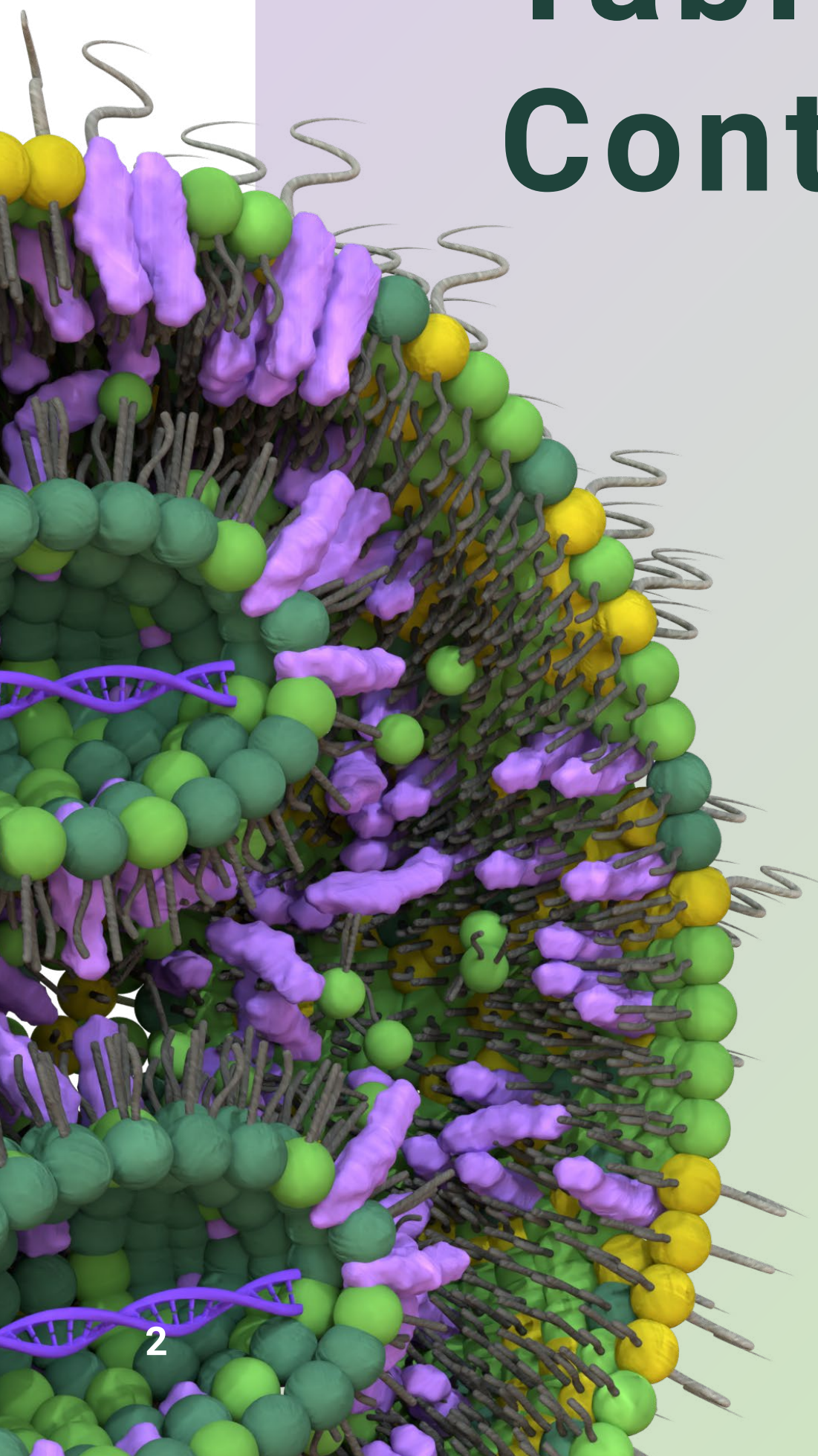
Polymer Conjugates



# CURAPATH

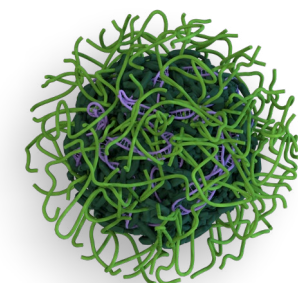


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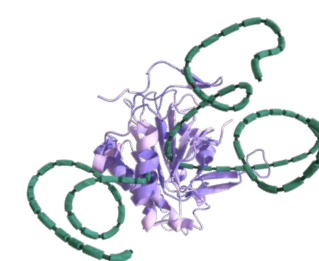
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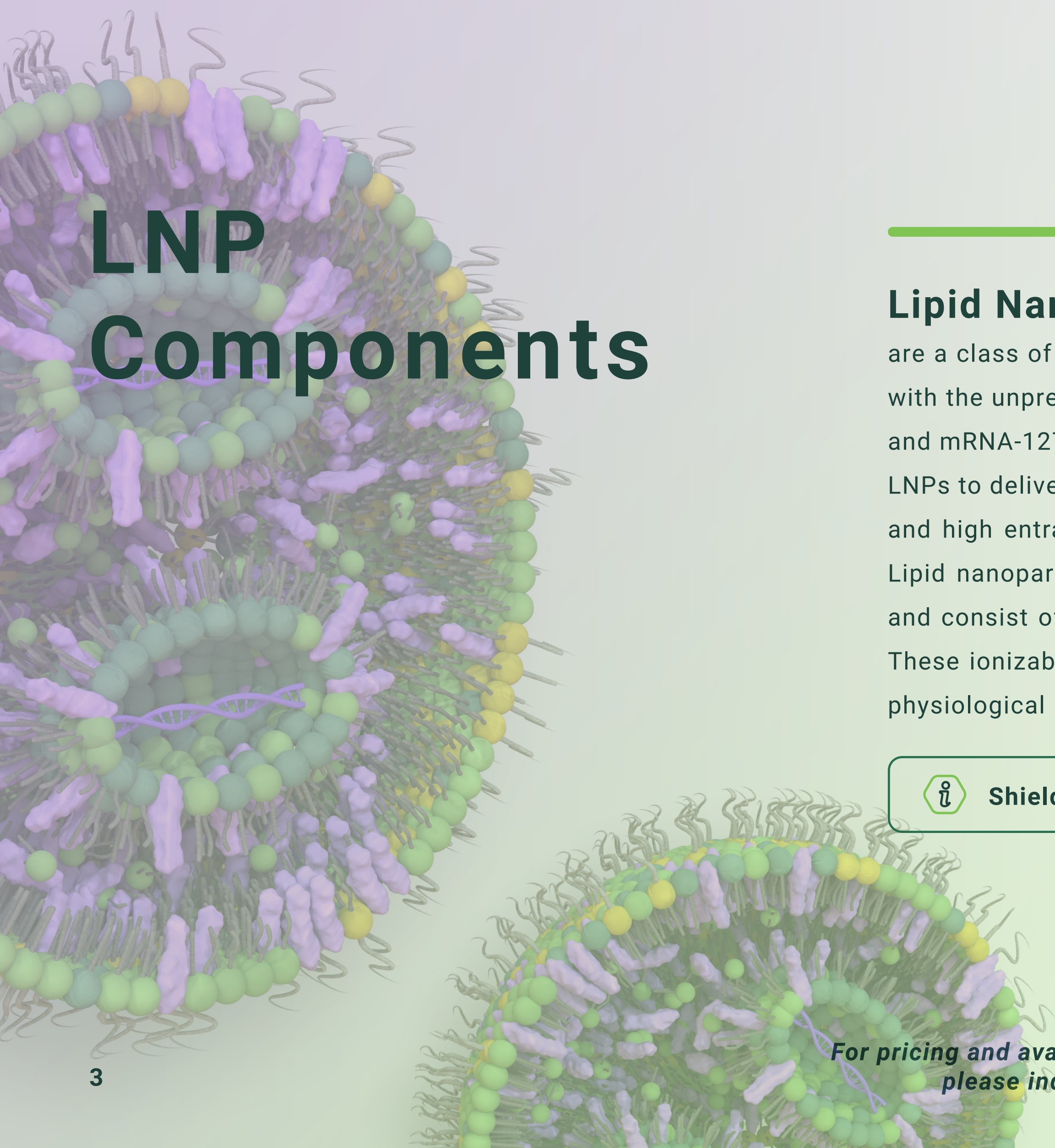


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# LNP Components

## Lipid Nanoparticles (LNPs)

are a class of non-viral vectors designed for nucleic acid delivery that has proven to be effective in the clinic with the unprecedented success of the SARS-CoV-2 vaccines BNT162b2 (“Comirnaty” from BioNTech/Pfizer)<sup>1</sup> and mRNA-1273 (“Spikevax” from Moderna). This has prompted pharmaceutical companies to focus on using LNPs to deliver nucleic acids. In addition to functional advantages, such as biocompatibility, biodegradability, and high entrapment efficiency, LNPs can be manufactured rapidly, reproducibly, and with high scalability. Lipid nanoparticles are spherical vesicles that contain a therapeutic payload (nucleic acids, peptides, etc.) and consist of cholesterol as a structural lipid, a helper lipid, a shielding lipid, and ionizable cationic lipids. These ionizable cationic lipids are positively charged at low pH (enabling RNA complexation) and neutral at physiological pH.



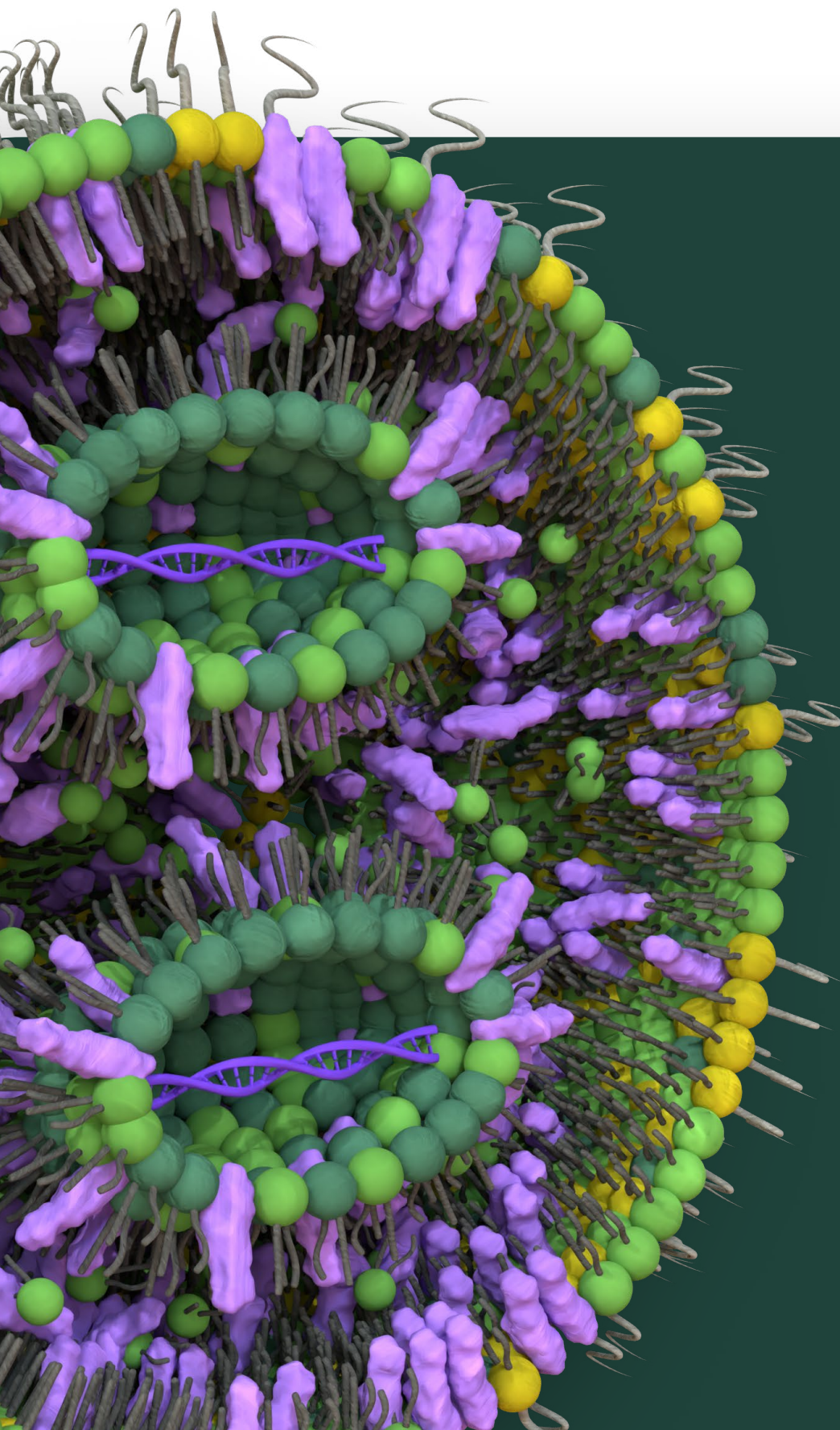
Shielding Lipids

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## LNP COMPONENTS

# Shielding Lipids

Shielding excipients are key ingredients in nanoparticle drug formulations, as they help to increase LNPs circulation time and bioavailability by minimizing aggregation, opsonization by serum proteins, and reticuloendothelial clearance by interaction with components of the bloodstream. Without shielding excipients, nanoparticles are readily recognized by the body's defense system and cleared from the systemic circulation.



## PSar Lipids

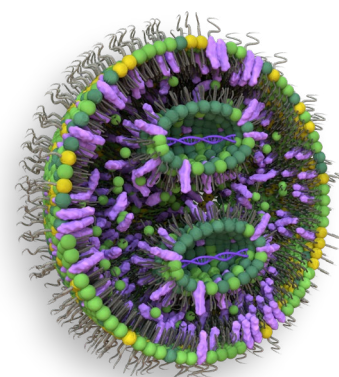
Polysarcosine (PSar) is one of the most promising alternatives as a solution to the limitations of polyethylene glycol (PEG). PSar is a nonionic polypeptoid based on the endogenous amino acid sarcosine (N-methylated glycine) with highly hydrophilic characteristics and solution properties similar to those of PEG. Thus, it provides water solubility, flexibility, immune evasion, low immunogenicity, and large hydrodynamic volume.

[See Product Breakdown](#)

## PGA-diol Lipids

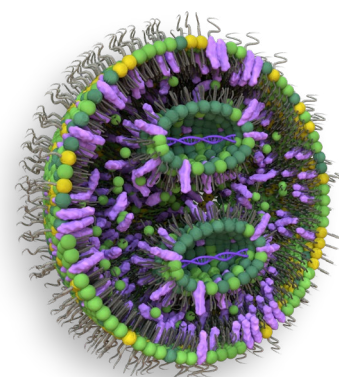
Polyglutamic acid (PGA) PGA-diol is a biodegradable mimetic of polyglycerols, which has shown to increase the circulation times of active ingredients in the bloodstream without generating rapid elimination from the body after repeated administrations. As a result, PGA-diol has demonstrated benefits in drug delivery and is proposed as an alternative to PEG.

[See Product Breakdown](#)



## LNP COMPONENTS Shielding Lipids

Product	Structure	Product #	MW (kDa)	Purity
Tetradecylamine-PSar(25)-H		CUR-L1032-25-100MG or -1G	2.0	>90%
Tetradecylamine-PSar(25)-acetyl		CUR-L1324-25-100MG or -1G		
N,N-ditetradecylamine-PSar(50)-H		CUR-L1041-50-100MG or -1G	2.2	
N,N-ditetradecylamine-PSar(50)-acetyl		CUR-L1325-50-100MG or -1G		
DMPE-PSar(50)-H		CUR-L1259-50-100MG or -1G	4.2	
DMPE-PSar(50)-acetyl		CUR-L1326-50-100MG or -1G		
iPrPSar(20)-succ-tocopherol		CUR-L1252-20-100MG or -1G	2.0	
iPrPSar(10)-succ-tocopherol		CUR-L1252-10-100MG or -1G	1.3	



## LNP COMPONENTS Shielding Lipids

Product	Structure	Product #	MW (kDa)	Purity
Tetradecylamine-PGA-diol(20)		CUR-L1285-20-100MG or -1G	4.3	>90%
Tetradecylamine-PGA-diol(10)		CUR-L1212-10-100MG or -1G	2.3	
N,N-ditetradecylamine-N-glycine-PGA-diol(20)		CUR-L1327-20-100MG or -1G	4.6	
DMPE-PGA-diol(30)		CUR-L1328-30-100MG or -1G	6.7	

# PNP Components



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## Polymeric Nanoparticles (PNPs)

offer an effective delivery method for a variety of payloads that include small molecules, proteins, and nucleic acids. When PNPs are used to encapsulate nucleic acids they have certain advantages, as they have a high surface area, small size, enhanced stability, can often control the cargo release rate. Polymeric nanoparticles can provide an effective means for nucleic acid delivery for gene therapy, gene editing, and other therapeutic applications outside the benefits observed in LNPs for mRNA delivery.



Shielding Block CoPolymers



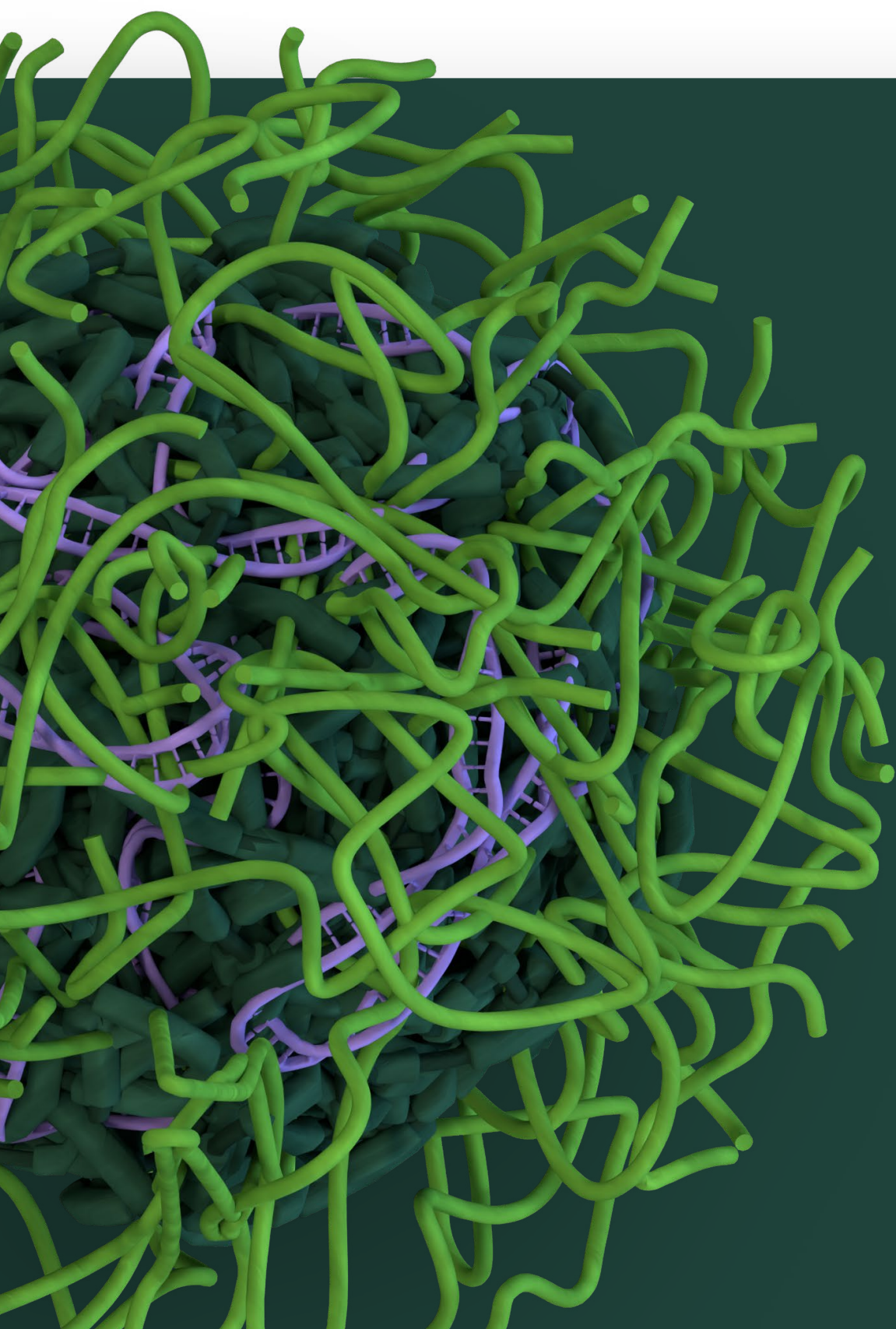
Amphiphiles

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please inquire at [order@curapath.com](mailto:order@curapath.com)

## PNP COMPONENTS

# Shielding Block CoPolymers

Shielding excipients/polymers confer stealth properties to nanoparticles. In addition, polymer nanoparticles show enhanced bioavailability and circulation time, as they help can avoid recognition as foreign particles by the body's immune system.

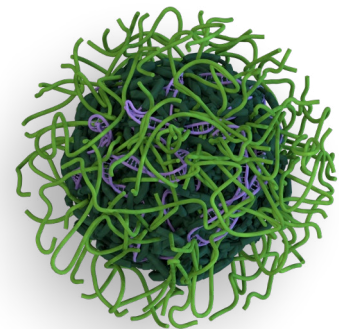


## PSar Polyanion Blocks

Polysarcosine (PSar) has chemical characteristics and solution properties similar to polyethylene glycol (PEG). Thus, it provides water solubility, flexibility, immune evasion, low immunogenicity, and large hydrodynamic volume. PSar is one of the most promising alternatives to the limitations of PEG's accelerated blood clearance (ABC) phenomenon. PSar is a nonionic polypeptoid based on the endogenous amino acid sarcosine (N-methylated glycine).

[See Product Breakdown](#)





PNP COMPONENTS

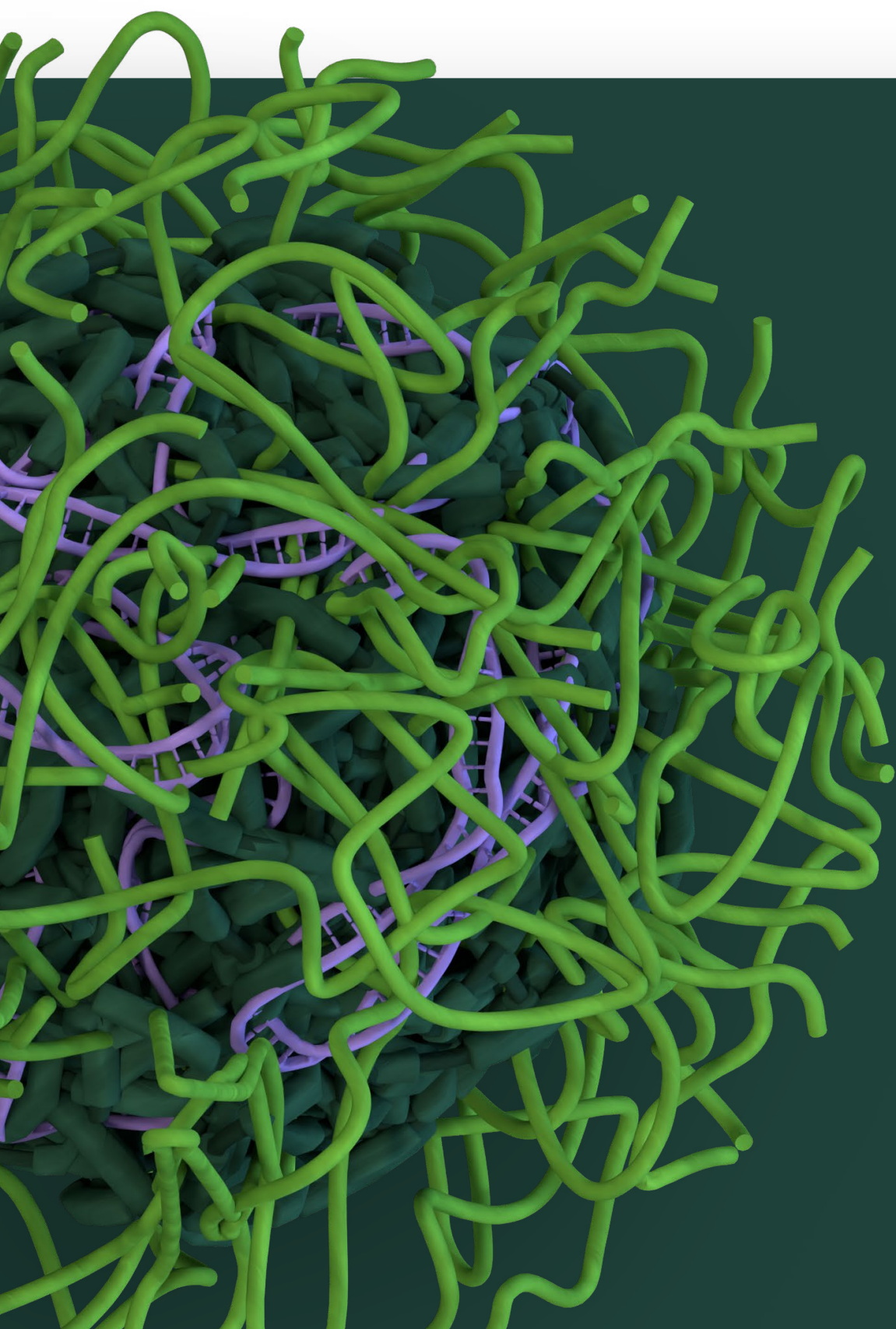
Shielding Block CoPolymers

Product	Structure	Product #	MW (kDa)	Purity
nBu-PSar(70)-b-PGlu(ONa)(10)-H		CUR-P1230-70-10-100MG or -1G	6.5	>90%
nBu-PSar(100)-b-PGlu(ONa)(15)-H		CUR-P1230-100-15-100MG or -1G	9.0	
nBu-PSar(140)-b-PGlu(ONa)(30)-H		CUR-P1230-140-30-100MG or -1G	14.5	
NH-Et-GALA-random-PSar(50)-acetyl		CUR-P1219-50-100MG or -1G	6.5	
NH-Et-GALA-random-PSar(80)-acetyl		CUR-P1219-80-100MG or -1G	8.6	
NH-Et-GALA-random-PSar(100)-acetyl		CUR-P1219-100-100MG or -1G	10.0	

## PNP COMPONENTS

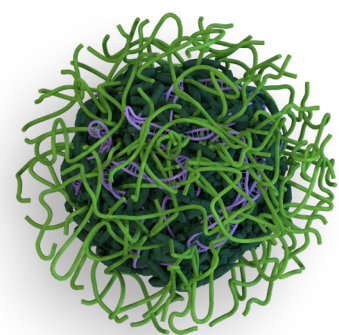
# Amphiphiles

Amphiphilic block copolymers are composed of two or more blocks of different chemical composition, which are linked by covalent bonds. The blocks are typically hydrophobic and hydrophilic, which gives the molecule both water-attracting and water-repelling properties. This allows the amphiphilic block copolymer to self-assemble into various structures in an aqueous solution. These structures can function as solubilizers or shielding lipids in multiple applications, including drug delivery.



## PEG-PBGs

 [See Product Breakdown](#)



## PNP COMPONENTS

# Amphiphiles

Product	Structure	Product #	MW (kDa)	Purity
PEG(114)-PBG(10)		CUR-P1329-5-10-100MG or -1G	7.2	>90%
PEG(114)-PBG(20)		CUR-P1329-5-20-100MG or -1G	9.4	
PEG(227)-PBG(10)		CUR-P1329-10-10-100MG or -1G	12.2	
PEG(227)-PBG(20)		CUR-P1329-10-20-100MG or -1G	14.4	

# Polymer Conjugates

## Polymer-based conjugates

have emerged as a promising strategy for drug delivery of therapeutics. Polymer conjugation is used for drug delivery in numerous applications, including small molecules, nucleic acids, and proteins, and can solve many bioavailability issues. Polymer conjugation with stealth or shielding polymers can offer many advantages: increased drug/biologic solubility, enhanced biocompatibility, and biodegradability, reduced immunogenicity, controlled drug release, reduced toxicity, and protects the drug from degradation while preserving its activity at the target site.



Activated shielding



Polyelectrolytes

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please inquire at [order@curapath.com](mailto:order@curapath.com)

## POLYMER CONJUGATES

# Activated Shielding

[Monofunctional PSar | Bifunctional PSar](#)[Monofunctional PGA-diol](#)

## Monofunctional PSar

Polysarcosine (PSar) is a nonionic polypeptoid based on the endogenous amino acid sarcosine (N-methylated glycine) these polymers have show biocompatibility and biodegradability within the body. PSar has chemical characteristics and solubility properties similar to polyethylene glycol (PEG). Thus, it provides water solubility, flexibility, immune evasion, low immunogenicity, and large hydrodynamic volume. PSar is one of the most promising alternatives to the limitations of PEG's accelerated blood clearance (ABC) phenomenon.

[See Product Breakdown](#)

## Bifunctional PSar

These PSar derivatives display two different functional groups at each extreme. They can be crosslinking agents or spacers between two different compounds. The PSar moiety provides water solubility, flexibility, immune evasion, low immunogenicity, and large hydrodynamic volume.

[See Product Breakdown](#)

## POLYMER CONJUGATES

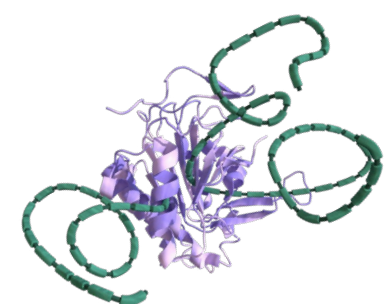
# Activated Shielding

[Monofunctional PSar | Bifunctional PSar](#)[Monofunctional PGA-diol](#)

## Monofunctional PGA-diol

Polyglutamic acid (PGA) PGA-diol is a biodegradable mimetic of polyglycerols, which have been shown to increase the circulation times of active ingredients in the bloodstream without generating rapid elimination from the body after several doses. As a result, PGA-diols have shown benefits in drug delivery and are proposed as an alternative to polyethylene glycol (PEG).

[See Product Breakdown](#)



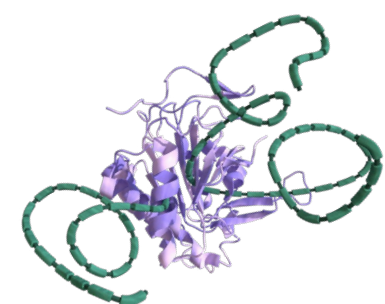
## POLYMER CONJUGATES

# Activated Shielding



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Product	Structure	Product #	MW (kDa)	Purity
MeA-PSar(200)-Mal		CUR-C1071-200-100MG or -1G	15	>90%
MeA-PSar(140)-Mal		CUR-C1071-140-100MG or -1G	10	
MeA-PSar(70)-Mal		CUR-C1071-70-100MG or -1G	5	
MeA-PSar(200)-COOH		CUR-C1231-200-100MG or -1G	15	
MeA-PSar(140)-COOH		CUR-C1231-140-100MG or -1G	10	
MeA-PSar(70)-COOH		CUR-C1231-70-100MG or -1G	5	



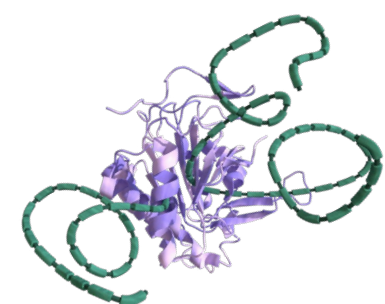
## POLYMER CONJUGATES

# Activated Shielding

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Product	Structure	Product #	MW (kDa)	Purity
MeA-PSar(200)-NHS		CUR-C1078-200-100MG or -1G	15	>90%
MeA-PSar(140)-NHS		CUR-C1078-140-100MG or -1G	10	
MeA-PSar(70)-NHS		CUR-C1078-70-100MG or -1G	5	
DBCO-PSar(200)-acetyl		CUR-C1074-200-100MG or -1G	15	
DBCO-PSar(140)-acetyl		CUR-C1074-140-100MG or -1G	10	
DBCO-PSar(70)-acetyl		CUR-C1074-70-100MG or -1G	5	



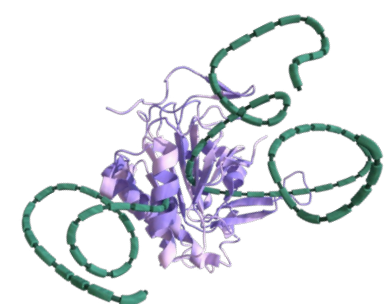


## POLYMER CONJUGATES Activated Shielding

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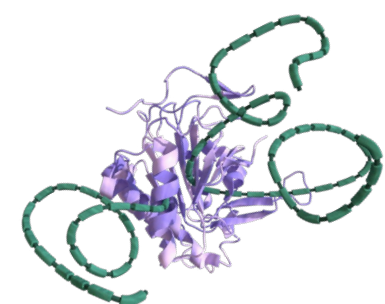
Product	Structure	Product #	MW (kDa)	Purity
Alkyne-PSar(200)-acetyl		CUR-C1330-200-100MG or -1G	15	>90%
Alkyne-PSar(140)-acetyl		CUR-C1330-140-100MG or -1G	10	
Alkyne-PSar(70)-acetyl		CUR-C1330-70-100MG or -1G	5	
Azide-PSar(200)-acetyl		CUR-C1322-200-100MG or -1G	15	
Azide-PSar(140)-acetyl		CUR-C1322-140-100MG or -1G	10	
Azide-PSar(70)-acetyl		CUR-C1322-70-100MG or -1G	5	



## POLYMER CONJUGATES

# Activated Shielding

Product	Structure	Product #	MW (kDa)	Purity
Azide-PSar(200)-COOH		CUR-C1109-200-100MG or -1G	15	>90%
Azide-PSar(140)-COOH		CUR-C1109-140-100MG or -1G	10	
Azide-PSar(70)-COOH		CUR-C1109-70-100MG or -1G	5	
Azide-PSar(200)-NHS		CUR-C1333-200-100MG or -1G	15	
Azide-PSar(140)-NHS		CUR-C1333-140-100MG or -1G	10	
Azide-PSar(70)-NHS		CUR-C1333-70-100MG or -1G	5	



## POLYMER CONJUGATES

# Activated Shielding

Product	Structure	Product #	MW (kDa)	Purity
Azide-PGA-diol(75)		CUR-C1331-75-100MG or -1G	15	>90%
Azide-PGA-diol(50)		CUR-C1331-50-100MG or -1G	10	
Azide-PGA-diol(25)		CUR-C1331-25-100MG or -1G	5	
Alkyne-PGA-diol(75)		CUR-C1332-75-100MG or -1G	15	
Alkyne-PGA-diol(50)		CUR-C1332-50-100MG or -1G	10	
Alkyne-PGA-diol(25)		CUR-C1332-25-100MG or -1G	5	

## POLYMER CONJUGATES

# Polyelectrolytes

Polyelectrolytes are used in polymer bioconjugation to create biohybrid materials that combine the advantages of both synthetic polymers and biological molecules. In addition, using polyelectrolytes allows the development of materials that can release drugs in a controlled manner.

PGA, Pglu, Polyglutamic acid | Polyornithine

Polyarginine | PLys, Polylysine

## PGA, Pglu, Polyglutamic acid

Polyglutamic acid (PGA) is a biodegradable, water-soluble, synthetic polymer for developing drug delivery systems. Curapath's patented methodology for synthesizing PGA allows us to obtain the desired molecular weight and low polydispersities. The carboxylic groups on the backbone support drug payload and ligand conjugation, providing a platform for specific recognition of target cells or tissues. In addition, the carboxylic groups can form ionic complexes with various cationic drugs, creating additional drug-carrying capacity.

 [See Product Breakdown](#)

## Polyornithine

Polyornithine (PO) is a synthetic polyamino acid with a large positive charge and a high affinity for negatively charged molecules, such as nucleic acids. It can be a transfection agent to deliver nucleic acids into cells. In addition, PO can enhance cell attachment when used as a coating to deliver drugs demonstrated in various cell types, including stem cells, cancer cells, and immune cells. Furthermore, it has been shown to improve nanoparticle drug release. Curapath's patented methodology to synthesize PO allows us to obtain the desired molecular weight and low polydispersity.

 [See Product Breakdown](#)

## POLYMER CONJUGATES

# Polyelectrolytes

PGA is a biodegradable, water-soluble synthetic polymer for the development of drug delivery systems. Our patented methodology allows to obtain it at the desired MW and with low polydispersities. The carboxylic groups of the backbone allow for payload conjugations.

PGA, Pglu, Polyglutamic acid | Polyornithine

Polyarginine | PLys, Polylysine

## Polyarginine

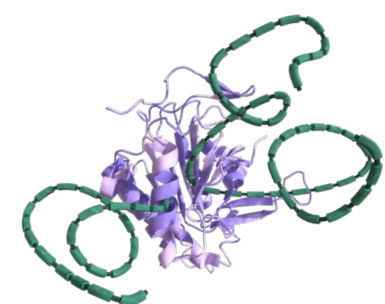
Polyarginine (PArg) is positively charged, has a high degree of solubility in water, and is resistant to proteolysis. Its positive charge makes it highly attractive to anionic surfaces and facilitates its cell-penetrating ability. PArg interacts with negatively charged molecules such as DNA and RNA, resulting in a decrease in their size and an increase in their cell-penetrating ability. In addition, the interaction of PArg with the cell membrane has demonstrated its ability to enhance transfection efficiency and improve cell penetration by forming pores in the membrane, allowing macromolecules to enter the cell.

 [See Product Breakdown](#)

## PLys, Polylysine

Poly-L-lysine (PLys) is commonly used to deliver nucleic acids and macromolecules. Polylysine is known for its ability to form complexes with cationic polymer molecules, which can enhance cell penetration of nucleic acids and macromolecules, promoting efficient delivery and uptake of these molecules. This property of PLys is especially beneficial for therapeutics and gene delivery, as it allows for increased efficacy and reduced toxicity. The PLys molecule has a high degree of flexibility, which enables it to easily bind to and interact with various polyanions, such as nucleic acids and macromolecules. In addition, PLys is non-toxic and biocompatible, making it a safe choice for gene delivery and therapeutics.

 [See Product Breakdown](#)

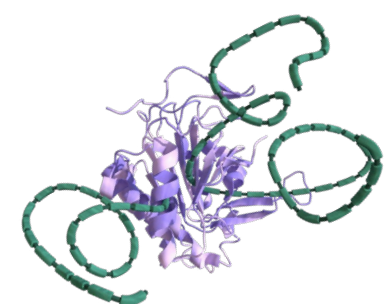


POLYMER CONJUGATES  
**Polyelectrolytes**



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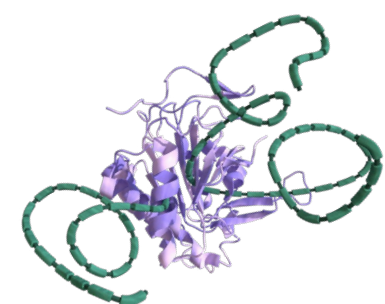
Product	Structure	Product #	MW (kDa)	Purity
nBuPGA20(ONa)		CUR-C1001-20-100MG or -1G	3.0	>90%
nBuPGA50(ONa)		CUR-C1001-50-100MG or -1G	7.5	
nBuPGA100(ONa)		CUR-C1001-100-100MG or -1G	15.1	
nBuPGA20(ONa)- Hydrazine (Backbone 10%mod)		CUR-C1334-20-100MG or -1G	3.2	
nBuPGA50(ONa)- Hydrazine (Backbone 10%mod)		CUR-C1334-50-100MG or -1G	8.0	
nBuPGA100(ONa)- Hydrazine (Backbone 10%mod)		CUR-C1334-100-100MG or -1G	16.0	



POLYMER CONJUGATES  
**Polyelectrolytes**

2 of 3

Product	Structure	Product #	MW (kDa)	Purity
nBuPGA20(ONa)- Alkyne (Backbone 10%mod)		CUR-C1335-20-100MG or -1G	3.1	>90%
nBuPGA50(ONa)- Alkyne (Backbone 10%mod)		CUR-C1335-50-100MG or -1G	7.6	
nBuPGA100(ONa)- Alkyne (Backbone 10%mod)		CUR-C1335-100-100MG or -1G	15.3	
nBuPGA20(ONa)- Azide (Backbone 10%mod)		CUR-C1007-20-100MG or -1G	3.4	
nBuPGA50(ONa)- Azide (Backbone 10%mod)		CUR-C1007-50-100MG or -1G	8.4	
nBuPGA100(ONa)- Azide (Backbone 10%mod)		CUR-C1007-100-100MG or -1G	16.9	



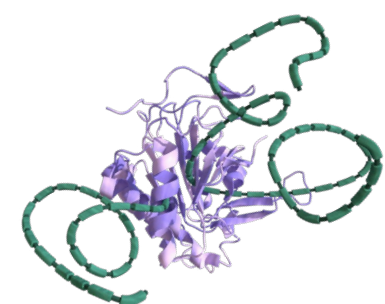
POLYMER CONJUGATES  
**Polyelectrolytes**

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Product	Structure	Product #	MW (kDa)	Purity
PGA20(ONa)-Alkyne		CUR-C1336-20-100MG or -1G	3.0	>90%
PGA50(ONa)-Alkyne		CUR-C1336-50-100MG or -1G	7.5	
PGA100(ONa)-Alkyne		CUR-C1336-100-100MG or -1G	15.1	
PGA20(ONa)-Azide		CUR-C1291-20-100MG or -1G	3.0	
PGA50(ONa)-Azide		CUR-C1291-50-100MG or -1G	7.5	
PGA100(ONa)-Azide		CUR-C1291-100-100MG or -1G	15.1	





## POLYMER CONJUGATES

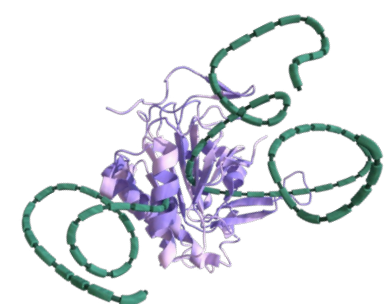
# Polyelectrolytes



1 of 3

Product	Structure	Product #	MW (kDa)	Purity
nBuPOrn20HCl	<chem>CCCCNC(=O)[C@@H](CCCC[NH3+])C(=O)N</chem>	CUR-C1018-20-100MG or -1G	3.0	>90%
nBuPOrn50HCl		CUR-C1018-50-100MG or -1G	7.5	
nBuPOrn100HCl		CUR-C1018-100-100MG or -1G	15.1	
nBuPOrn200HCl		CUR-C1018-200-100MG or -1G	30.1	

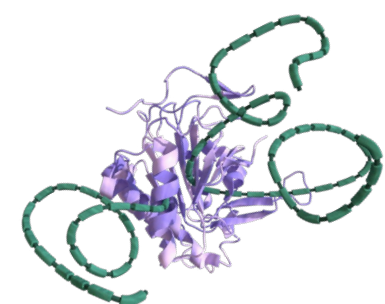




POLYMER CONJUGATES  
**Polyelectrolytes**

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Product	Structure	Product #	MW (kDa)	Purity
POrn20HCl-Alkyne		CUR-C1337-20-100MG or -1G	3.0	>90%
POrn50HCl-Alkyne		CUR-C1337-50-100MG or -1G	7.5	
POrn100HCl-Alkyne		CUR-C1337-100-100MG or -1G	15.1	
POrn200HCl-Alkyne		CUR-C1337-200-100MG or -1G	30.1	

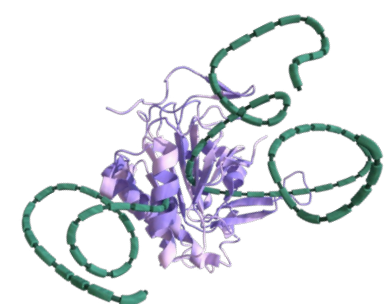


POLYMER CONJUGATES  
**Polyelectrolytes**

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Product	Structure	Product #	MW (kDa)	Purity
POrn20HCl-Azide		CUR-C1162-20-100MG or -1G	3.0	>90%
POrn50HCl-Azide		CUR-C1162-50-100MG or -1G	7.5	
POrn100HCl-Azide		CUR-C1162-100-100MG or -1G	15.1	
POrn200HCl-Azide		CUR-C1162-200-100MG or -1G	30.1	

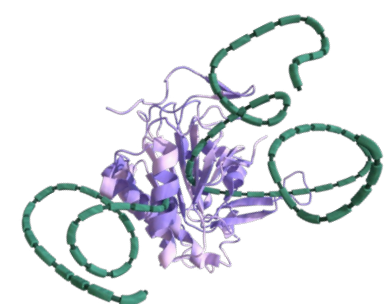


POLYMER CONJUGATES  
**Polyelectrolytes**



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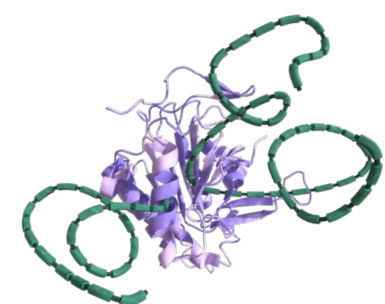
Product	Structure	Product #	MW (kDa)	Purity
nBuArg20HCl		CUR-C1108-20-100MG or -1G	3.8	>90%
nBuPArg50HCl		CUR-C1108-50-100MG or -1G	9.6	
nBuPArg100HCl		CUR-C1108-100-100MG or -1G	19.2	
nBuPArg200HCl		CUR-C1108-200-100MG or -1G	38.4	



POLYMER CONJUGATES  
**Polyelectrolytes**

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Product	Structure	Product #	MW (kDa)	Purity
PArg20HCl-Alkyne		CUR-C1339-20-100MG or -1G	3.8	>90%
PArg50HCl-Alkyne		CUR-C1339-50-100MG or -1G	9.6	
PArg100HCl-Alkyne		CUR-C1339-100-100MG or -1G	19.2	
PArg200HCl-Alkyne		CUR-C1339-200-100MG or -1G	38.4	

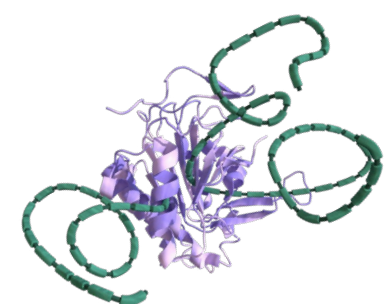


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**Polyelectrolytes**

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Product	Structure	Product #	MW (kDa)	Purity
PArg20HCl-Azide		CUR-C1163-20-100MG or -1G	3.8	>90%
PArg50HCl-Azide		CUR-C1163-50-100MG or -1G	9.6	
PArg100HCl-Azide		CUR-C1163-100-100MG or -1G	19.2	
PArg200HCl-Azide		CUR-C1163-200-100MG or -1G	38.4	

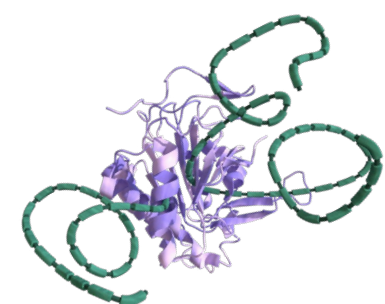


POLYMER CONJUGATES  
**Polyelectrolytes**



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Product	Structure	Product #	MW (kDa)	Purity
nBuPLys20HBr		CUR-C1030-20-100MG or -1G	4.2	>90%
nBuPLys50HBr		CUR-C1030-50-100MG or -1G	10.5	
nBuPLys100HBr		CUR-C1030-100-100MG or -1G	20.9	
nBuPLys200HBr		CUR-C1030-200-100MG or -1G	41.8	
nBuPLys1000HBr		CUR-C1030-1000-100MG or -1G	209.0	
mPEG4-PLys400HBr		CUR-C1030-400-100MG or -1G	83.7	

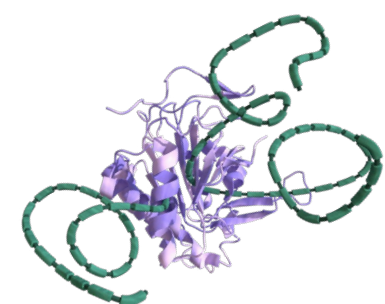


POLYMER CONJUGATES  
**Polyelectrolytes**

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Product	Structure	Product #	MW (kDa)	Purity
PLys20HBr-Alkyne		CUR-C1338-20-100MG or -1G	4.2	>90%
PLys50HBr-Alkyne		CUR-C1338-50-100MG or -1G	10.5	
PLys100HBr-Alkyne		CUR-C1338-100-100MG or -1G	20.9	
PLys200HBr-Alkyne		CUR-C1338-200-100MG or -1G	41.8	





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**Polyelectrolytes**

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Product	Structure	Product #	MW (kDa)	Purity
PLys20HBr-Azide		CUR-C1161-20-100MG or -1G	4.2	>90%
PLys50HBr-Azide		CUR-C1161-50-100MG or -1G	10.5	
PLys100HBr-Azide		CUR-C1161-100-100MG or -1G	20.9	
PLys200HBr-Azide		CUR-C1161-200-100MG or -1G	41.8	



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