



New Modifications of Ionizable Lipids Creating Effective Therapeutic Compounds

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- Research and development subsidiary of the Biosolve group
- Expert in custom synthesis in organic chemistry in three different fields of biotechnology

Synthetic lipids

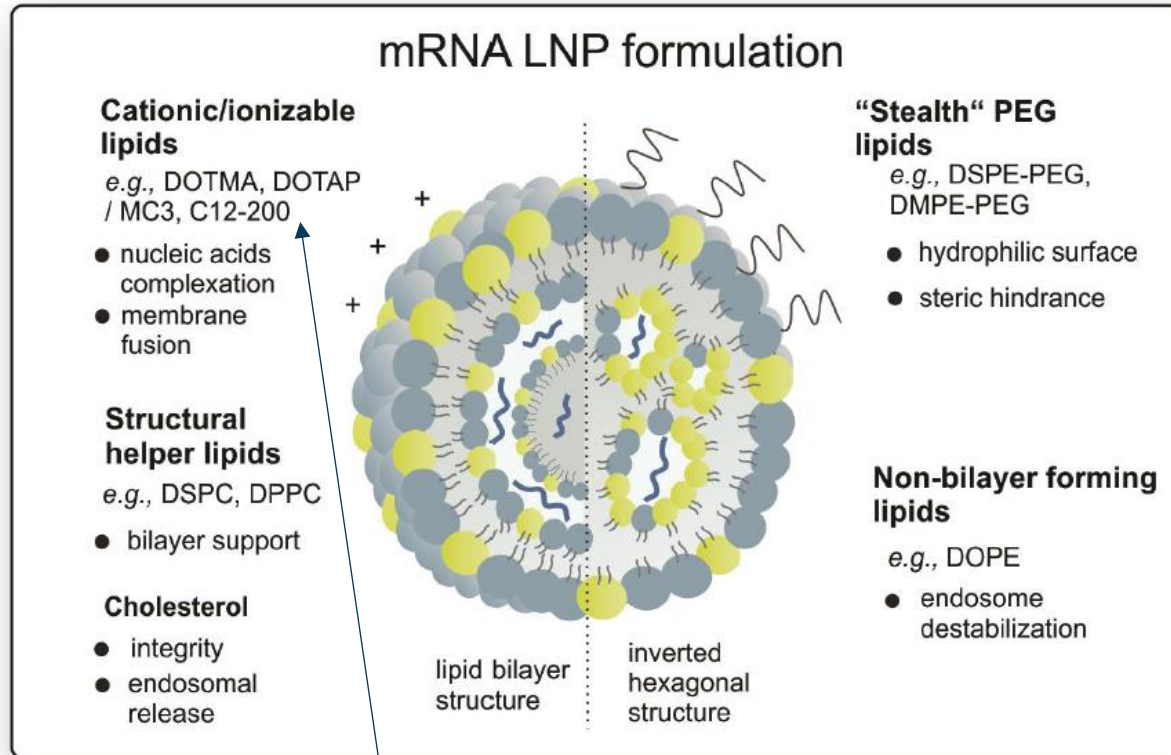
Nucleosyn produces and supplies synthetic lipids from milligrams to multi-kilos quantities.
Example: ionizable & cationic lipids for LNPs formulation

DNA & RNA

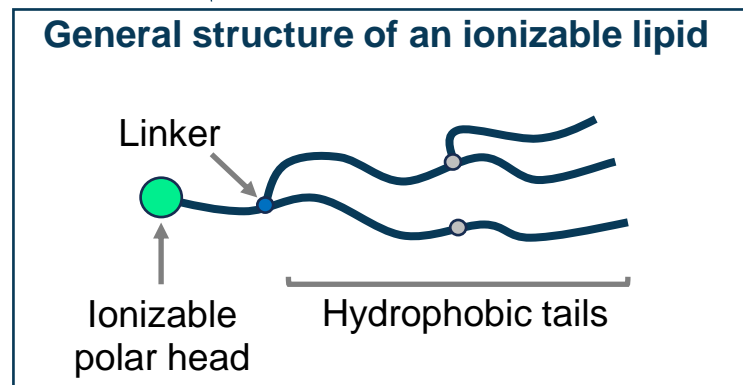
Nucleosyn offers an extensive line of standard and custom phosphoramidites, RNA phosphoramidites, specialty amidites, modifiers, CPG...

Standard Isotopes Labeled compounds

Nucleosyn provides custom stable isotope (^2H , ^{13}C , ^{15}N) compounds for bioanalytics, omics research, biomarker quantification...



R. Verbeke et al., *Nano. Today*, 2019, 28, 100766



Cationic & Ionizable lipids :

- ✓ Structure: Affinity with nucleic acids to be vectorized.
- ✓ Polar head: Affinity with anionic phospholipids of the endosomal membrane for destabilization and release of the nucleic acid (pKa value)
- ✓ Linker: Easily cleaved to release the nucleic acid and reduce toxicity (biodegradable)
- ✓ Hydrophobic tail: Structuration of stable LNPs with good shape and size (geometry)

Helper lipids :

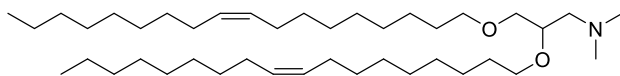
- ✓ LNP stabilization and endosome destabilization

Main characteristics of a synthetic lipid:

- ✓ pH-dependant ionization
- ✓ Decreased toxicity and prolonged blood circulation of the corresponding LNPs

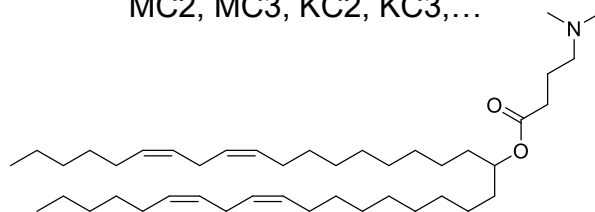
An extensive line of ionizable lipids:

Tertiary amine polar head
DODMA, DSDAP, DODAP, YSK05,...



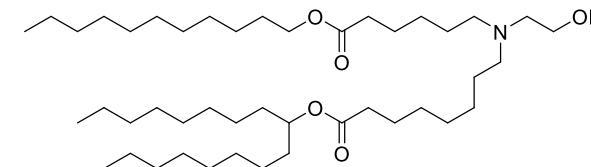
DODMA
CAS 104162-47-2
4LSC4959

DLin-DMA derivatives
MC2, MC3, KC2, KC3,...



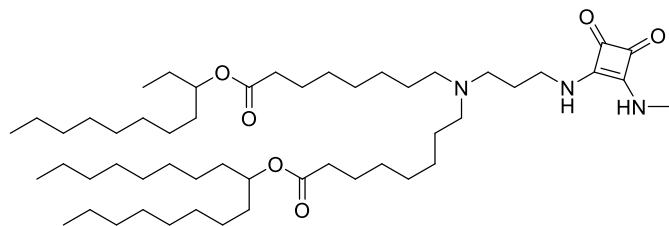
DLin-MC3-DMA
CAS 1224606-06-7
4LSC3133

Amino-alcohol polar head
ALC-0315, Lipid H, Lipid 5,...



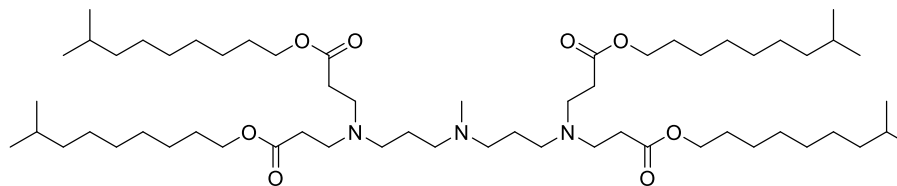
Lipid H (SM-102)
CAS 2089251-47-6
4LSC4405

Functionalized polar head
Lipid 29 (squaramide),
Lipid-20b & 29d (thio-lipids),...



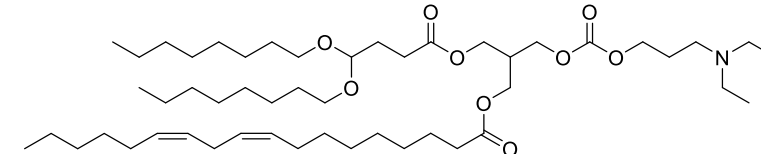
Lipid 29
CAS 2244716-55-8
4LSC4990

Branched lipids
cKK-E12, C12-200, 306Oi10,...



306Oi10
CAS 2322290-93-5
4LSC4472

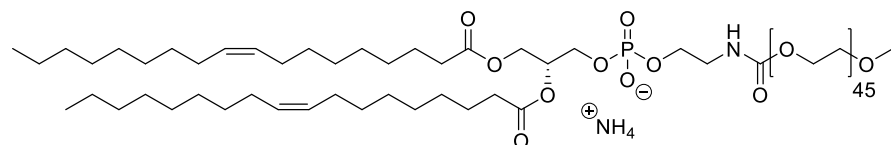
Biodegradable lipids
LP-01, L-319, L-322,...



LP-01
CAS 1799316-64-5
4LSC4989

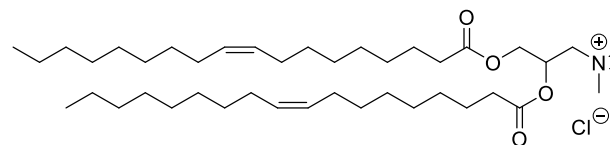
Other synthetic lipids provided by Nucleosyn:

Helper lipids (PEG- & Phospholipids):
DOPE, DSPC, DMG-PEG2000,...



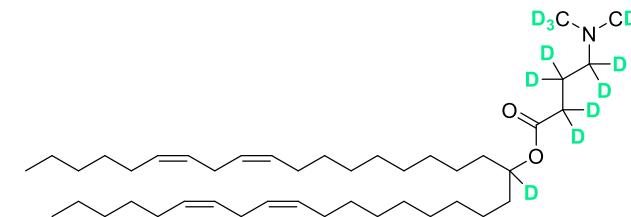
PEG 2000 PE (18:1)
CAS 474922-90-2
4LSC5000

Cationic lipids (permanent charge):
DOBAQ, DOTAP, DOTMA,...



DOTAP
CAS 132172-61-3
4LSC4686

Labeled ionizable lipids:
[D₁₃]- & [¹³C₃]-DLin-MC3-DMA, [¹³C₃]-Lipid 5

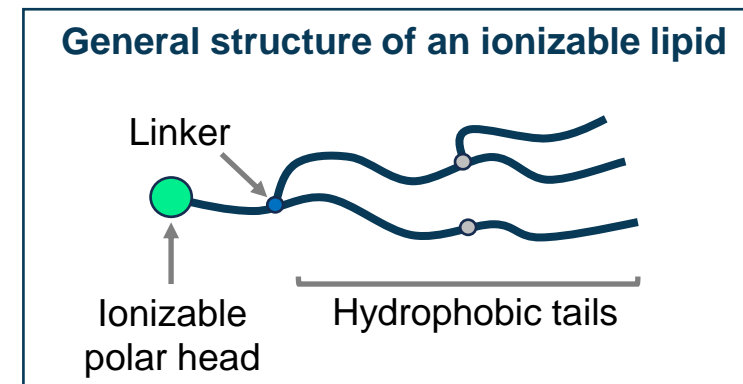


[D₁₃]-DLin-MC3-DMA
4LSC4992

Custom synthesis services:

✓ Strong expertise in « Taylor-made customization » of ionizable lipids for improved drug delivery:

- ❑ Construction of novel complex polar heads
- ❑ Wide range of linkage types
- ❑ Introduction of unprecedented hydrophobic tails: saturated, (poly-)unsaturated, ramified, functionalized,...



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ALC-0315
ALC-0315 is one of the components in the BNT162b2 (Pfizer-Biontech) vaccine against SARS-CoV-2. Administration of (SAR...

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Nucleosyn is **expert in DNA & RNA synthesis reagents, synthetic lipids and stable isotope labelled molecules**. We have **particular expertise in the specialized chemistry, purification and analytical techniques** required to synthesize these challenging compounds. Nucleosyn's business has been built around its **unique chemistry skills and experience in custom synthesis**. By using novel chemical synthetic approaches alongside classical methodologies, Nucleosyn has earned a reputation for completing even the most challenging synthesis on time and to full requirement.



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