Bioconjugation for Targeted Therapeutics for Cancer & Beyond

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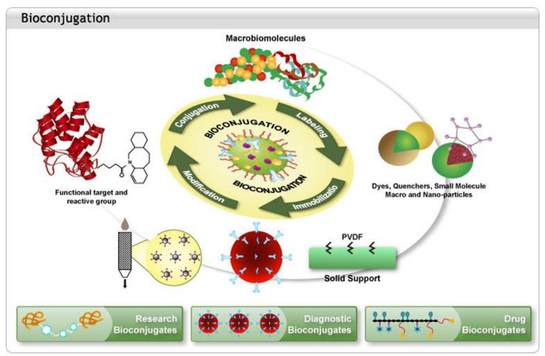
Abstract

Bioconjugates enable advanced targeted drug delivery, offering a more precise and often less toxic approach compared to traditional chemotherapy. Bioconjugates achieve this by combining a biological molecule, such as an antibody, peptide, or protein, with a therapeutic drug, toxin, or imaging agent. Correctly designed bioconjugates enable targeted delivery to cancer cells with minimal damage to healthy tissues, increased drug potency at the tumor site, reduced systemic side effects, improved drug pharmacokinetics, extended half-life, and increased solubility. Modification in bioconjugates protected them from degradation, allowing them to overcome drug resistance with enhanced efficacy. Additionally, bioconjugates enable the development of diagnostic and imaging techniques that are useful for personalized medicine and theranostics, facilitating targeted therapies.



Reference

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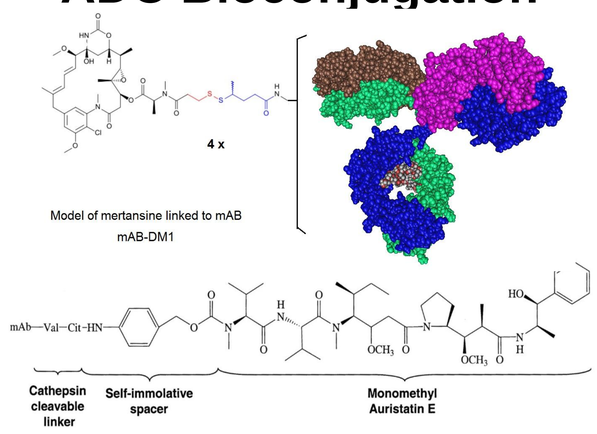
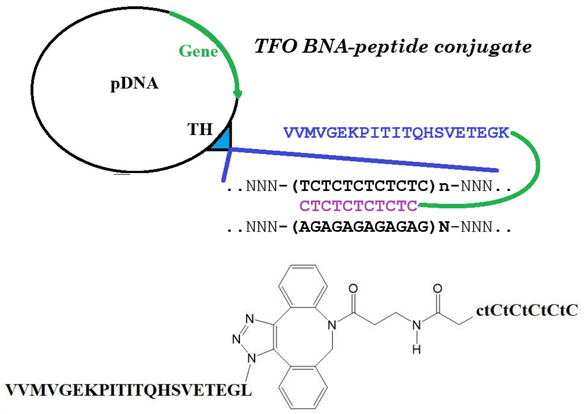
ADC Bioconjugation

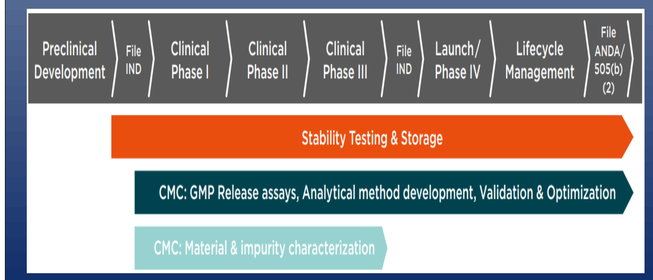


Antibody drug conjugates for cancer therapeutics

Triplex-Forming BNA Oligonucleotide Peptide Conjugates Enables Cell Transfection

Triplex forming bridged nucleic acid (BNA) oligonucleotides conjugated to peptides enable the delivery of plasmid DNA to the nucleus with increased transfection efficiency.



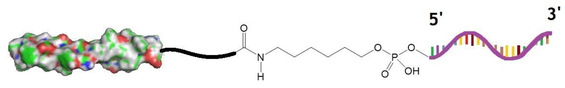


Linker Chemistries

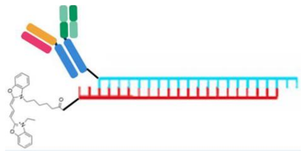
Oligonucleotides & mRNA from Discovery to Production

Peptide Linkers and Linker Peptides for Antibody Drug Conjugates (ADCs), Fusion Proteins, and Oligonucleotides

Linker Function	Fusion Protein	Linker	
		Type	Sequence[a]
Increase Stability/Folding	scFv	flexible	$(GGGGS)_3$
	G-CSF-Tf	flexible	$(GGGGS)_3$
	HBsAg preS1	flexible	$(GGGGS)_3$
	Myc- Est2p	flexible	$(Gly)_8$
	albumin-ANF	flexible	$(Gly)_6$
	virus coat protein	rigid	$(EAAAK)_3$
	beta-glucanase-xylanase	rigid	$(EAAAK)_n$ (n=1-3)
Increase expression	hGH-Tf and Tf-hGH	rigid	A(EAAAK)4ALEA(EAAAK)4A
	G-CSF-Tf and Tf-G-CSF	rigid	A(EAAAK)4ALEA(EAAAK)4A

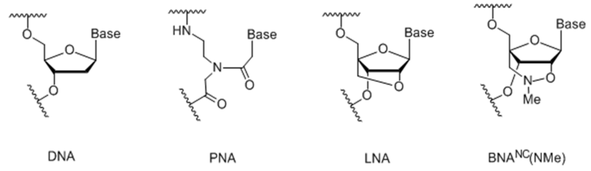


High Quality Bioconjugats

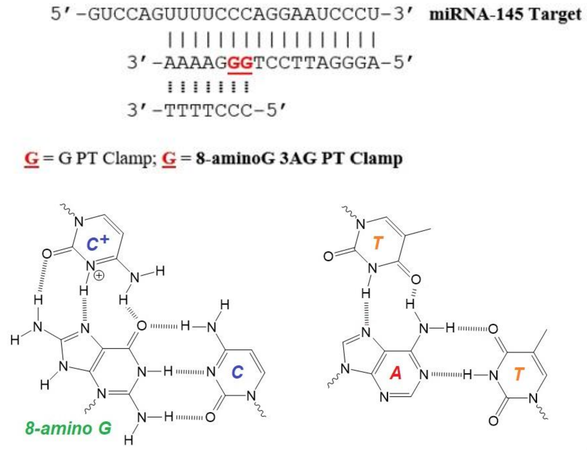


- siRNA
- GalNac-siRNA
- ASO
- GalNac-ASO
- Gapmers
- Bio-conjugation
- mRNAs
- Lipid-oligonucleotides
- Cholesterol-oligonucleotides

Common Modifications



Triplex Formation Enables Detection of microRNAs



Conclusion

These examples of bioconjugates illustrate the feasibility of creating novel biomolecules by utilizing different targeting molecules, linkers and payloads for the development of specific homing biomolecules, allowing the delivery of various payloads to cellular targets.

In the near future, we are planning to expand our synthesis expertise and portfolio to include other complex molecules such as ADCs, siRNA conjugates, and ASOs as well as scaling up their synthesis.