Drug delivery explores the utilization of technologies that transport drugs to their intended target site.

Compared with small molecules and proteins, **peptides** offer improved biocompatibility, reduced cost, tunable bioactivity, specific targeting, ease of synthesis and modification, making them highly promising for the development of novel drug delivery systems[1, 2].

To achieve the desired therapeutic effects, various aspects of peptides have been introduced into drug delivery systems, such as targeting peptides, cell-penetrating peptides, and responsive peptides. Peptide-based drug delivery systems have gained widespread uses in the form of peptide-drug conjugates, injectable biodegradable particles, and depots for effectively delivering therapeutic agents[2].

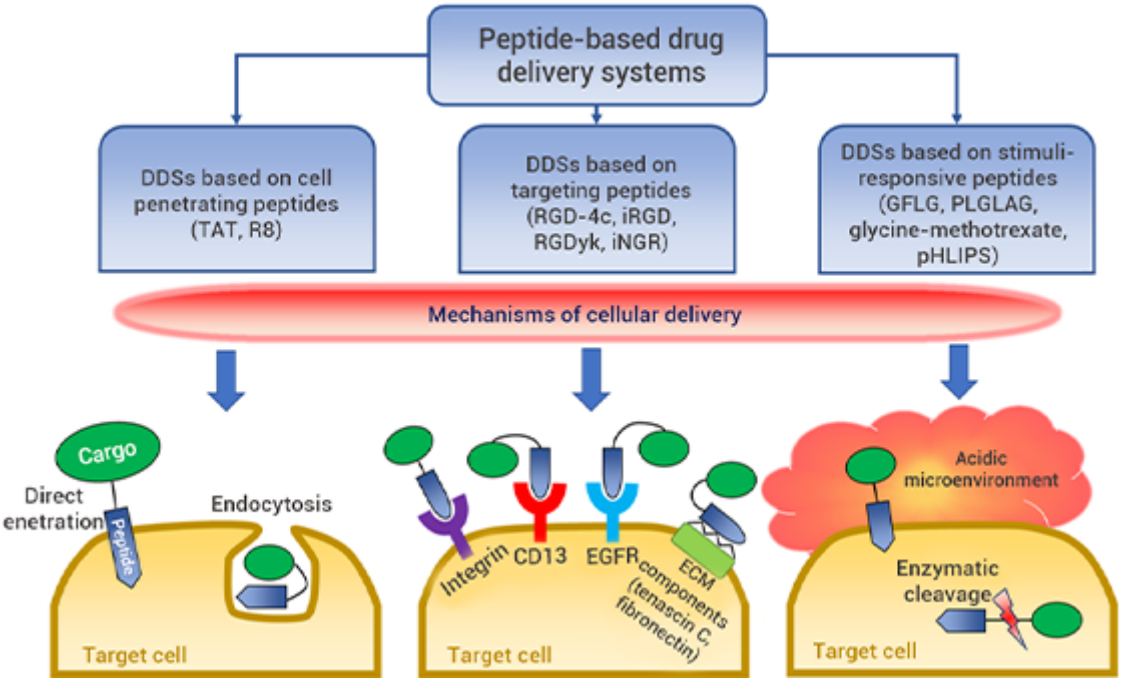

Figure 1. Mechanisms of cellular delivery of three typical peptide-based drug delivery systems[2].

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Category	Product Name	Description
Cell-penetrating Peptides	**(Arg)9 Acetate**	A cell-penetrating peptide made up of 9 arginine residues.
	TAT (48-57)	A cell-penetrating peptide derived from HIV-1 transactivator of transcription (Tat) protein residue 48-57.
	Penetratin	A cell-penetrating peptide derived from the amphiphilic Drosophila Antennapedia homeodomain.
	Melittin TFA	A peptide can bind to and penetrate the enterocyte brush border, causing leakage into the cytosol and increased paracellular passage into the lamina propria.
	TAT-HA2 Fusion Peptide	A peptide-based delivery agent that combines the pH-sensitive HA2 fusion peptide from Influenza and the cell-penetrating peptide TAT from HIV.
Targeting Peptides	**Cyclic somatostatin**	A peptide acts as an inhibitor of endocrine and exocrine secretion via the activation of five G-protein-coupled receptors, named SSTR1-5.
	iRGD peptide	

		A peptide triggers tissue penetration of agents by initially binding to av integrins, then proteolytically cleaved within the tumor to produce CRGDK/R, which interact swith neuropilin-1. This peptide exhibits both tumor-targeting and tumor-penetrating properties.
	Cyclo(RGDyK)	A potent and selective αVβ3 integrin inhibitor.
	RGD peptide (GRGDNP)	A peptide competitively inhibits α5β1 binding with extracellular matrix (ECM).
	NGR peptide TFA	A peptide containing Asn-Gly-Arg (NGR) motif that can bind to APN/CD13, is usually conjugated to drugs for tumor imaging.
Stimuli-responsive Peptides	**DgHBP-2**	A 26-amino-acid-long peptide derived from histidine-rich beak protein-2 can be used in fabricated glucose-responsive insulin delivery systems.
	pH-Low Insertion Peptide	A pH-sensitive peptide that serves as a specific ligand, targeting the acidic microenvironment of tumor during early and metastatic stages.
Self-assembling Peptides	**KLD-12**	A 12-residue self-assembling peptide that can form peptide hydrogel with β-sheet structure.
	RAD16-I hydrochloride	A self-assembling nano-fibrous peptide with biocompatible and biodegradable properties, can be used to encapsulate cells.

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References:

[1] *Molecules*. 2019, 24(2): 351.

[2] *Medicina*. 2021, 57(11): 1209.

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