

Natural-derived drug carriers (NDDCs) for precision therapy

Wei HE, Yujie SHI, Ding QU

Citation: Wei HE, Yujie SHI, Ding QU, Natural-derived drug carriers (NDDCs) for precision therapy, *Chinese Journal of Natural Medicines*, 2024, 22(12), 1065–1066. doi: [10.1016/S1875-5364\(24\)60748-X](https://doi.org/10.1016/S1875-5364(24)60748-X).

View online: [https://doi.org/10.1016/S1875-5364\(24\)60748-X](https://doi.org/10.1016/S1875-5364(24)60748-X)

Related articles that may interest you

[Emerging mechanisms of non-alcoholic steatohepatitis and novel drug therapies](#)

Chinese Journal of Natural Medicines. 2024, 22(8), 724–745 [https://doi.org/10.1016/S1875-5364\(24\)60690-4](https://doi.org/10.1016/S1875-5364(24)60690-4)

[Progress in approved drugs from natural product resources](#)

Chinese Journal of Natural Medicines. 2024, 22(3), 195–211 [https://doi.org/10.1016/S1875-5364\(24\)60582-0](https://doi.org/10.1016/S1875-5364(24)60582-0)

[Approved drugs and natural products at clinical stages for treating Alzheimer's disease](#)

Chinese Journal of Natural Medicines. 2024, 22(8), 699–710 [https://doi.org/10.1016/S1875-5364\(24\)60606-0](https://doi.org/10.1016/S1875-5364(24)60606-0)

[Dual-function natural products: Farnesoid X receptor agonist/inflammation inhibitor for metabolic dysfunction-associated steatotic liver disease therapy](#)

Chinese Journal of Natural Medicines. 2024, 22(11), 965–976 [https://doi.org/10.1016/S1875-5364\(24\)60706-5](https://doi.org/10.1016/S1875-5364(24)60706-5)

[Modulation of type I interferon signaling by natural products in the treatment of immune-related diseases](#)

Chinese Journal of Natural Medicines. 2023, 21(1), 3–18 [https://doi.org/10.1016/S1875-5364\(23\)60381-4](https://doi.org/10.1016/S1875-5364(23)60381-4)

[Traditional Chinese medicines derived natural inhibitors of ferroptosis on ischemic stroke](#)

Chinese Journal of Natural Medicines. 2024, 22(8), 746–755 [https://doi.org/10.1016/S1875-5364\(24\)60603-5](https://doi.org/10.1016/S1875-5364(24)60603-5)



Wechat



“Natural-derived drug carriers (NDDCs) for precision therapy” Special Issue

•Editorial•

Natural-derived drug carriers (NDDCs) for precision therapy

HE Wei^{1*}, SHI Yujie^{2*}, QU Ding^{3*}¹ School of Pharmacy, China Pharmaceutical University, Nanjing 211198, China;² School of Pharmaceutical Sciences, Peking University, Beijing, 100191, China;³ Affiliated Hospital of Integrated Traditional Chinese and Western Medicine, Nanjing University of Chinese Medicine, Nanjing 210028, China

Available online 20 Dec., 2024

[Document code] A [Article ID] 2095-6975(2024)12-1065-02

Drug carriers are systems that alter how a drug enters the body and its distribution within the body, control the rate of drug release and deliver the drug to the target organ [1]. Systems that use drug carriers to control the release of drugs have received widespread attention as they can improve drug utilization, safety and efficacy, and thus can reduce the frequency of drug administration [2]. The discovery of liposomes in 1965 inspired the discovery and design of multiple drug carriers, including polymers, micelles, chitosan, *etc.* [3]. However, traditional synthetic drug carriers suffer from the inability to cross natural barriers and difficulties in escaping immune surveillance and have more significant side effects in clinical applications. Therefore, the research of drug carriers based on natural sources has emerged. Hence, natural-derived drug carriers (NDDCs) are attracting increasing attention. NDDCs are particles with drug-carrying functions based on natural inspirations and design carriers based on the properties of natural biomaterials, which are chemically, physically, or morphologically similar to the biological structures. NDDCs include, for example, a variety of natural sources of particulate carriers such as exosomes, protein particles (*e.g.*, albumin, *etc.*), lipoproteins, cellular carriers, viral carriers, carriers constructed from natural materials (*e.g.*, polysaccharides), *etc.* NDDCs need to have three characteristics: firstly, inert repulsion, where particles physically protect doped drugs from destructive factors such as oxygen, light, enzymes, *etc.*; secondly, overcoming barriers, which can cross the natural biological barriers and overcome the endocytosis obstacles; and thirdly, active action, *i.e.*, specific activation of

the target biological processes.

Herein, we guest-edit this special issue for CJNM with the theme of “Natural-derived drug carriers (NDDCs) for precision therapy for precision therapy” to summarize the field advancement. First, Yang and He *et al.* comprehensively reviewed the NDDCs with application prospects and summarized the approved products [4]. Li *et al.* reviewed the combination products of stem cell-derived exosomes and medical devices, such as tissue engineering scaffolds, microneedle patches, dressing, and filling agents [5]. Subsequently, different natural material-based NDDCs for delivering various natural compounds were reviewed for disease therapy. For instance, Yue *et al.* summarized the structural characteristics of natural porous nanoclays and their potential to deliver essential oils [6]. Shi *et al.* reviewed the natural endogenous materials and the related NDDCs for the delivery of macromolecular drugs [7]. Gao and Zhang *et al.* summarized recent advances in glycyrrhizic acid-based multifunctional nanoplat-form for cancer treatment and tumor postoperative care [8]. Lastly, we reviewed the delivery and disease treatment of some natural drug active ingredients. For instance, Qi and Yang *et al.* introduced the delivery of active ingredients of Chinese herbal medicines for tumor treatment (such as ginsenosides, ursolic acid, glycyrrhizic acid, *etc.*) [9]. Han discussed active herbal ingredients and drug delivery design for tumor therapy [10]. Gao and Zhang *et al.* summarized the transdermal drug delivery system, which carries natural active products to combat atopic dermatitis [11].

We hope this theme issue offers a platform for researchers to discuss using NDDCs for precision therapy. The cutting-edge understanding of NDDCs can also guide rational design and translation. We would like to take this opportunity to thank the authors for their tireless efforts and valuable insights in making this work a reality.

[Received on] 10-Sep.-2024

[*Corresponding author] E-mails: weihe@cpu.edu.cn (HE Wei); yujestone@bjmu.edu.cn (SHI Yu-Jie); quding1985@hotmail.com (QU Ding)

These authors have no conflict of interest to declare.

References

- [1] Li X, Zou J, He Z, *et al.* The interaction between particles and vascular endothelium in blood flow [J]. *Adv Drug Deliver Rev*, 2024, **2024**: 115216.
- [2] Zoulikha M, Chen Z, Wu J, *et al.* Approved delivery strategies for biopharmaceuticals. [J]. *Chin Chem Lett*, 2025, **36**: 110225.
- [3] Zhang W, Jiang Y, He Y, *et al.* Lipid carriers for mRNA delivery [J]. *Acta Pharm Sin B*, 2023, **13**(10): 4105-4126.
- [4] Li XT, Lai YY, Wan GH, *et al.* Approved natural-derived nanomedicines for disease treatment [J]. *Chin J Nat Med*, 2024, **22**(12): 1100-1116.
- [5] Zhai YW, He F, Fang J, *et al.* Advances in the combination of stem cell exosomes with medical devices-the new direction for combination products [J]. *Chin J Nat Med*, 2024, **22**(12): 1067-1075.
- [6] Chen HX, Su XY, Luo YJ, *et al.* Natural-derived porous nano-carriers for the delivery of essential oils [J]. *Chin J Nat Med*, 2024, **22**(12): 1117-1133.
- [7] Lu A, Du K, Wang M, *et al.* Natural endogenous material-based vehicles for delivery of macromolecular drugs [J]. *Chin J Nat Med*, 2024, **22**(12): 1163-1176.
- [8] Xiao M, Guo ZQ, Yang YT, *et al.* Glycyrrhizic acid-based multifunctional nanoplatform for tumor microenvironment regulation [J]. *Chin J Nat Med*, 2024, **22**(12): 1089-1099.
- [9] Han J, Shen YX, Cao RY, *et al.* Active herbal ingredients and drug delivery design for tumor therapy: a review [J]. *Chin J Nat Med*, 2024, **22**(12): 1134-1162.
- [10] Yang L, Wang YN, Ye XT, *et al.* Traditional Chinese medicine-based drug delivery systems for anti-tumor therapies [J]. *Chin J Nat Med*, 2024, **22**(12): 1177-1192.
- [11] Li MH, Xu YH, Yu YN, *et al.* Transdermal delivery of natural products against atopic dermatitis [J]. *Chin J Nat Med*, 2024, **22**(12): 1076-1088.

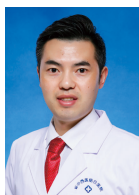
Cite this article as: HE Wei, SHI Yujie, QU Ding. Natural-derived drug carriers (NDDCs) for precision therapy [J]. *Chin J Nat Med*, 2024, **22**(12): 1065-1066.



Dr. Wei He is a professor at the College of Pharmaceutical Science, China Pharmaceutical University (since July 2012). He obtained his Ph.D. from Fudan University, worked as a project leader in CSPC Pharmaceutical Co., Ltd. from 2007 to 2009, as a researcher at Alberta University (Canada) and as a visiting scholar at Harvard University from November 2018 to October 2019. His current research mainly includes biopharmaceutical delivery and vascular-targeted drug delivery. He is the editorial board member of Chinese Chemical Letters, Pharmaceutics and Acta Pharmaceutica Sinica B and the guest editor of Acta Pharmaceutica Sinica B and Advanced Drug Delivery Reviews. He has published more than 100 papers, with 7 highly cited papers.



Dr. Yujie Shi is a lecturer at School of Pharmaceutical Sciences, Peking University (since August 2005). She graduated from China Pharmaceutical University and obtained her Ph.D. degree from Peking University, worked as a visiting scholar at Harvard University from July 2018 to July 2020. She is the editorial board member of Chinese Chemical Letters. She is currently focused on developing innovative strategies to overcome the challenges associated with the oral bioavailability of hydrophobic small-molecule therapeutics and macromolecules. She has published over 30 research papers in journals, including Advanced Science, Journal of Controlled Release, Advanced Healthcare Materials, Acta Pharmaceutica Sinica B, and Chinese Chemical Letters.



Dr. Ding Qu is a professor at the Jiangsu Academy of Chinese Medicine (Affiliated Hospital of Integrated Traditional Chinese and Western Medicine, Nanjing University of Chinese Medicine). Qu obtained his Ph.D. from China Pharmaceutical University, and was a senior visiting scholar at the University of Massachusetts Medical School (USA) from August 2019 to September 2020. His current leading research includes traditional Chinese medicine-based drug delivery systems for various tumor- and inflammation-related disease therapies. He is a young editorial board member of Acupuncture and Herbal Medicines, Chinese Traditional and Herbal Drugs, Chinese Journal of Hospital Pharmacy, and Brain-X (contributing editor). He has published more than 60 papers, with more than 1000 citations.