Editorial

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Medication Delivery with Nanoparticles

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Editorial

Drug Delivery

The 1950s may be considered the birth year of controlled release medication delivery. In 1952, the Spansule technique was created to deliver a medication for 12 hours. When compared to taking a medication every 6 or 8 hours, twice-daily formulations were revolutionary in terms of increasing patient compliance and convenience. Since then, developments in drug delivery technology have produced a wide range of formulations and equipment for boosting treatment effectiveness, lowering adverse effects, and boosting patient compliance. The purpose of targeted drug delivery is to deliver the provided medicine to the target areas as much as possible, while minimising the drug distribution to any non-target organs. Over the past two decades, nanotechnology-based delivery systems have progressed explosively [1].

Despite the fact that cancer treatment has significantly improved thanks to nanoparticle technology, tailored drug delivery using nanoparticles has not lived up to expectations.

Rapid clearance from blood circulation, a limited ability to cross several physiological barriers, and low drug concentration in the targeted sites continue to be obstacles to the practical application of nanotherapeutics. Because of their unique benefits, such as high loading capacity, favourable biocompatibility, low immunogenicity, prolonged circulation period, and instinctive targeting ability, many biomimetic delivery techniques have recently been created in order to address the aforementioned issues.

Natural materials and synthetic nanoparticles can interact and move through complicated biological systems in the body more efficiently by drawing design cues from nature. Due to their inherent qualities, cell-based biomimetic drug delivery systems have become a useful replacement for the traditional nanocarriers. As carriers, various cell types have been employed. Leukocyte-derived biomimetic nanoparticle delivery systems for cancer therapy and cell membrane-based nanoparticles for tumour diagnostics and treatment, respectively, are updated in the current issue by Jun Chen and Jianxin Wang. In order to maximise these nanoparticles' potential for use in illness detection and treatment, Zhiqing Pang presents an overview of biomimetic nanoparticles that target inflammation [2-5].

Jing Qin presented one instance of how the body's neutrophils can target the inflamed brain more effectively (see a story for the front cover). The in vivo phagocytic uptake of the nanoparticles by neutrophils was selectively increased by 6- to 7-fold through the conjugation of N-acetyl Pro-Gly-Pro (PGP) peptide, a high-affinity ligand to CXCR2 receptor on neutrophils, to the surfaces of the nanoparticle. The PGP-SLNs were then transported to the areas of the brain lesions by neutrophils acting as "Trojan Horses [6]."

The use of materials derived from endogenous chemicals as medication delivery vehicles is common.

Natural biomacromolecules have become more popular among them due to their inherent biochemical and biophysical characteristics. The biochemical characteristics of common biomacromolecule-based carriers like albumin, lipoproteins, and polysaccharides are introduced by Chen Jiang. The biological characteristics and biomedical uses of rHDL as drug delivery platforms to get beyond biological barriers in vivo are succinctly summarised by Xiaoling Gao. The biomimetic albumin-modified gold nanorods (AuNRs) with paclitaxel (PTX) can promote cellular uptake via the albumin-binding protein pathway and be used for combined photothermo-chemotherapy for yielding synergistic effects to enhance treatment efficiency and reduce side effects, according to research by Yongzhuo Huang and colleagues [7].

Tao Sun describes PTX-loaded human serum albumin (HSA) NPs modified with substance P (SP) peptide as the targeted ligand and stabilised with intramolecular disulfide bonds. The SP peptide's alteration enhances the NPs' anti-tumor activity and cellular absorption into brain capillary endothelial cells and U87 cells. By simulating the in vivo process of natural materials and/or coupling with endogenous ligands, it is possible to achieve

enhanced targeted delivery or absorption of nanoparticles. Wei Wu identifies thiamine (VB1) and niacin as the two vitamins that act as ligands to facilitate the oral delivery of insulin-loaded liposomes [8]. The coupled Y-shaped peptide A7R-GICP may enhance the ability to target tumours and the neovasculature, according to Mingfei Zhang and Weiyue Lu, who link A7R and GICP to create a multi-receptor targeting molecule for glioma.

Huining He creates a cell penetrating peptide (LMWP) and siRNA monomeric covalent compound using a cytosol-cleavable disulfide bond, and he shows in vitro that the conjugate successfully absorbed the siRNA agents and had strong effects on gene silencing [9,10].

We hope that the readers of this Special Issue will find this information useful in learning more about the research being done and the most recent developments in bio-inspired medication delivery systems. We are grateful to everyone who contributed to the educational and unique nature of this issue.

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Conflict of Interest

The author has no known conflicts of interested associated with this paper.

References

1 Strougo A, Eissing T, Yassen A, Willmann S, Danhof M (2012) First dose in children: physiological insights into pharmacokinetic scaling approaches and their implications in paediatric drug development. J Pharmacokinet Pharmacodyn 39(2): 195-203.

2 Vinks AA, Emoto C, Fukuda T (2015) Modeling and simulation in pediatric drug therapy: application of pharmacometrics to define the right dose for children. Clin Pharmacol Ther 98(3): 298-308.

3 Wagner C, Zhao P, Pan Y, Hsu V, Grillo J (2015) Application of physiologically based pharmacokinetic (PBPK) modeling to support dose selection: report of an FDA Public Workshop on PBPK. CPT Pharmacomet Syst Pharmacol 4(4): 226-230.

4 Benigni, Perico, Macconi (2016) Mitochondrial dynamics is linked to longevity and protects from end-organ injury: the emerging role of sirtuin 3. Antioxidants Redox Signal 25: 185-199.

5 Bernstein, Shen, Gonzalez Villalobos, Billet, Okwan Duodu (2011) Different in vivo functions of the two catalytic domains of angiotensin-converting enzyme (ACE). Curr Opin Pharmacol 11: 105-111.

6 Bessho, Takiyama, Kitsunai, Takeda, Sakagami (2019) Hypoxia-inducible factor-1α is the therapeutic target of the SGLT2 inhibitor for diabetic nephropathy. Sci Rep 9: 147-154.

7 Bossi, Bernardi, De Nardo, Bramante, Candido (2016) Angiotensin 1-7 significantly reduces diabetes-induced leukocyte recruitment both in vivo and in vitro. Atherosclerosis 244: 121-130.

8 Brent, G A (2012) Mechanisms of thyroid hormone action. J Clin Invest 122: 3035-3043.

9 Liu G, Xiao M, Zhang (2017) A review of air filtration technologies for Sustainable and healthy building ventilation. Sustain Cities Soci 32: 375–396.

10 Audrey Forthomme, Aurélie Joubert, Yves Andrès (2014) Microbial aerosol filtration: Growth and release of a bacteria–fungi consortium collected by fibrous filters in Different operating conditions. Journal of Aerosol Science 72: 32-46.