ERITROCITI KAO SISTEMI ZA ISPORUKU LEKOVITIH SUSPSTANCI: NAPREDAK U RAZVOJU I KLINIČKIM ISPITIVANJIMA

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Sistemi za isporuku lekovitih supstanci zasnovani na ćelijama su postali efikasan pristup u lečenju bolesti "savremenog doba" zbog brojnih prednosti u odnosu na druge prirodne ili sintetičke nosače. Stoga su se istraživači i kliničari poslednjih godina fokusirali na razvoj bioloških nosača poreklom iz ćelija bakterija i sisara (1). Eritrociti, trombociti, leukociti, matične ćelije, fibroblasti, hepatociti i kancerske ćelije su među različitim tipovima ćelija sisara koje se koriste kao novi sistemi za isporuku lekovitih supstanci. Među njima, eritrociti su opsežno proučavani i pokazali su veliki potencijal za kontrolisanu, produženu i ciljanu isporuku lekovitih supstanci, i mogućnost realne kliničke primene u budućnosti (2,3). Uspeh kliničkih ispitivanja L-asparaginaze i deksametazon natrijum fosfata inkapsuliranih u autologe humane eritrocite (faza 1 i 3, respektivno) potvrđuju značaj ove strategije u isporuci lekova u poslednje dve decenije (2). Pomenute procedure su dale izuzetno zadovoljavajuće rezultate u lečenju teških inflamatornih/malignih bolesti kako sa farmakokinetičkog tako i sa farmakološkog aspekta, bez pojave pratećih neželjenih efekata. U okviru ovog predavanja biće predstavljena tekuća dostignuća u razvoju sistema za isporuku lekova zasnovanih na eritrocitima, naglašavajući značajan klinički napredak, zajedno sa izveštajima o bezbednosti, efikasnosti i podnošljivosti takvih sistema. Prednosti i nedostaci su posebno istaknuti kako bi se dobila kritička tačka gledišta o postojećoj i budućoj medicinskoj primeni eritrocita kao nosača lekovitih supstanci. Kao primer složenosti istraživanja i razvoja ovakvih sistema, što je posebno značajno u slučaju primene ksenogenih eritrocita, biće razmotrena morfološka, biohemijska analiza i procena profila oslobađanja lekovitih supststanci iz razvijenih eritrocitnih nosača, a koja su deo istraživanja naše grupe.

Literatura

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ADVANCEMENTS IN DEVELOPMENT AND CLINICAL TRIALS OF ERYTHROCYTES AS DRUG DELIVERY SYSTEMS

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In recent years, cell-based delivery systems have emerged as an effective approach for treating "modern age" diseases due to their numerous advantages over natural or synthetic carriers. Thus, researchers and clinicians have focused on biological carriers derived from bacterial and mammalian cells (1). Erythrocytes, platelets, leukocytes, stem cells, fibroblasts, hepatocytes, and cancer cells are among the various types of cells that have been utilized as novel drug delivery systems. Among these, erythrocytes have been extensively studied and have shown great potential for controlled, prolonged, and targeted drug delivery, with real clinical applications on the horizon (2,3). The success of clinical trials involving autologous L-asparaginase and dexamethasone sodium phosphate loaded human erythrocytes over the past two decades (Phase 1 and 3, respectively) supports this notion (2). These procedures have yielded very satisfactory results in treating severe inflammatory/malignant diseases without associated side effects, from both the pharmacokinetic and pharmacodynamic perspectives. The lecture will offer a well-rounded summary of the ongoing efforts in developing drug delivery systems based on erythrocytes, highlighting the significant clinical progress achieved so far, along with safety, efficacy, and tolerability reports. The advantages and drawbacks are specifically summarized to get a critical point of view on existing and future medical applications of erythrocyte-based drug carriers. As an example of complexity in research toward development of such erythrocyte-based drug delivery systems starting from animal erythrocyte, morphological, biochemical and drug release profile assessment will be reviewed.

References

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