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One of the significant challenges in the field of drug delivery remains to be insufficient targeting of diseased tissues or cells. In a Review of this issue, ... Show more

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Determinants of Use of Biotherapeutics in sub-Saharan Africa

Rajiv Shah, Dzifa Dey, Thomas Pietzonka, Paul Obeng, Bisola Ashiru, Martin Schiestl, Andrew Cavey, Edwin Nkansah, Guerric Radiere, Jonathan Spector, Christiaan Scott

Biologic drugs are reshaping clinical practice in various disciplines, even while access to them is imbalanced across global settings. In sub-Saharan Africa, biotherapeutics have potential roles to play in the treatment of a range of conditions that include infectious and noncommunicable diseases (NCDs). However, the literature is scarce on guidance for addressing local access challenges, including technical, regulatory, affordability, and other healthcare delivery aspects. This article aims to assess fundamental determinants of use of biologic medicines in sub-Saharan Africa.

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Reviews

Pharmacological Targeting of Endoplasmic Reticulum Stress in Pancreatic Beta Cells

Sara Bilekova, Stephan Sachs, Heiko Lickert

Diabetes is a disease with pandemic dimensions and no pharmacological treatment prevents disease progression. Dedifferentiation has been proposed to be a driver of beta-cell dysfunction in both type 1 and type 2 diabetes. Regenerative therapies aim to re-establish function in dysfunctional or dedifferentiated beta cells and restore the defective insulin secretion. Unsustainable levels of insulin production, with increased demand at disease onset, strain the beta-cell secretory machinery, leading to endoplasmic reticulum (ER) stress.

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Targeting the Immune System for Ischemic Stroke

Shenpeng R. Zhang, Thanh G. Phan, Christopher G. Sobey

Stroke is responsible for almost 6 million deaths and more than 10% of all mortalities each year, and two-thirds of stroke survivors remain disabled. With treatments for ischemic stroke still limited to clot lysis and/or mechanical removal, new therapeutic targets are desperately needed. In this review, we provide an overview of the complex mechanisms of innate and adaptive immune cell-mediated inflammatory injury, that exacerbates infarct development for several days after stroke. We also highlight the features of poststroke systemic immunodepression that commonly leads to infections and some mortalities, and argue that safe and effective therapies will need to balance pro- and anti-inflammatory mechanisms in a time-sensitive manner, to maximize the likelihood of an improved long-term outcome.

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Biological Cells as Therapeutic Delivery Vehicles

Lucas M. Bush, Connor P. Healy, Shwan B. Javdan, Jonathan C. Emmons, Tara L. Deans

One of the significant challenges remaining in the field of drug delivery is insufficient targeting of diseased tissues or cells. While efforts to perform targeted drug delivery by engineered nanoparticles have shown some success, there are underlying targeting, toxicity, and immunogenicity challenges. By contrast, live cells usually have innate targeting mechanisms, and can be used as drug-delivery vehicles to increase the efficiency with which a drug accumulates to act on the intended tissue. In some case

when no native cell types exhibit the desired therapeutic phenotype, preferred outcomes can be achieved by genetically modifying and reprogramming cells with gene circuits.

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Featured Article

Organ-on-a-Chip: A New Paradigm for Drug Development

Chao Ma, Yansong Peng, Hongtong Li, Weiqiang Chen

The pharmaceutical industry has been desperately searching for efficient drug discovery methods. Organ-on-a-Chip, a cutting-edge technology that can emulate the physiological environment and functionality of human organs on a chip for disease modeling and drug testing, shows great potential for revolutionizing the drug development pipeline. However, successful translation of this novel engineering platform into routine pharmacological and medical scenarios remains to be realized. In this review, we discuss how the Organ-on-a-Chip technology can have critical roles in different preclinical stages of drug development and highlight the current challenges in translation and commercialization of this technology for the pharmacological and medical end-users.

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