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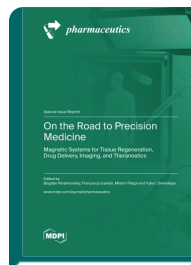
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On the Road to Precision Medicine: Magnetic Systems for Tissue Regeneration, Drug Delivery, Imaging, and Theranostics

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Over the past decade, it has become increasingly evident that several diseases cause patient-specific pathological features, which are at the root of the response variability observed with generic treatments. This has led to the emergence of precision and personalized medicine, in which therapy selection is tailored to each specific individual. To achieve this goal, a treatment can be carried out through various strategies. Tailored nano/microsystems can be obtained via functionalization with molecules that can recognize specific molecular markers and then are internalized into pathological cells. Systems loaded with both imaging contrast agents and drugs can be used simultaneously in therapy and diagnosis (theranostics). Moreover, certain materials can be engineered to achieve controlled or conditional drug release in situ, or can even be externally navigated and delivered to the diseased region. In this regard, magnetic systems stand as extremely potent and versatile tools since they can be easily modified on the surface, and thus allow for specific cell targeting and imaging via multiple techniques. In addition, they can destroy target cells via a hyperthermic effect, as well as affect the behavior of the cells and lead to spatial translocation under the guidance of externally applied magnetic forces.



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