

Mikro/Nanorobotlar

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Giriş

Nano boyutlu ilaç taşıyıcı sistemler, özellikle azaltılmış sistemik toksisite, kan dolaşımında uzun süre kalabilme, gerçek zamanlı görüntüleme, etkin maddenin yüksek verimle hedef dokuya iletilmesi ve değiştirilebilir işlevsellik avantajlarına sahiptir (1). Mikro ve nano boyutlu ilaç taşıyıcı sistemlerin hareketinin kontrolü, etkin maddelerin bu sistemlerden salımının düzenlenmesi ve hedeflendirilmesi ile hastalık ve ölüm riskini azaltma imkanı sunmaktadır (2).

Mikro/nanorobot (MNR) kavramı ilk olarak 1959 yılında Feynman tarafından ortaya atılmıştır (3). MNR'ler, algılayabilen, sinyal verebilen, yanıt verebilen ve işleyebilen mikro veya nano boyutlu, zekaya ve bilgiye sahip makinelerdir (4) (Şekil 1). Ürettikleri enerjiyi mekanik kuvvete veya harekete dönüştürebilirler. Pasif ilaç taşıyıcı sistemlerle karşılaştırıldığında, MNR'lerin otonom hareket etme yeteneği, adezyon ve doku penetrasyonunu önemli ölçüde artırabilir. MNR'lerin farklı hücrelere ve dokulara hızlı bir şekilde alınmasının bir sonucu olarak, yüklenen terapötik madde hedef bölgelere daha verimli bir şekilde iletilir (5).

Bu bölümde MNR'lerin ilaç taşıyıcı sistemler olarak özellikleri, üretim yöntemleri, itici güç kaynakları, ilaçların MNR aracılığıyla hedeflendirilmesi ve MNR ile tedavi yaklaşımlarından bahsedilecektir.

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