

5. BÖLÜM

ELEKTROPORASYON VE KLİNİK UYGULAMARI

Ümmihan TOPAL¹

GİRİŞ

Hücreler tüm canlı organizmaların temel yapı taşları olup bilgiyi moleküller aracılığıyla iletir. Moleküller bilginin para birimi olarak hücresel yapıdan sorumludur ve hücreleri belirli fonksiyonlara yönlendirir. Hücreler elektronik bir cihazdan son derece daha karmaşık olup nasıl çalıştığı hala araştırılmaktadır. Başta kanser olmak üzere bir çok hastalığın kaynağında öncelikle hücrelerin düzensizliği ve bozukluğu yer alır. Bu hastalıkların tedavisinde eksojen moleküllerin ve ilgili maddelerin hücrelere tanıtılmasıyla hücrelerin normal işlevine ve dokuların iyileşmesine katkıda bulunması nedeniyle yeniden programlama önemli bir stratejidir.

Elektroporasyon, bir hücrenin veya bir dokunun harici bir elektrik alanına maruz bırakılması ile hücre zarlarında porlar oluşturulması işlemine denir. Hücre dışı ortamdaki hücresel bileşenlere bir bariyer olarak işlev gören hücre zarı yaklaşık 5 nm kalınlığında bir lipid çift katmanından oluşur. Elektroporasyon hücre zarında gözeneklerin (nano por) oluşmasına neden olur. Elektroporasyon tedavi stratejimize göre geri döndürülebilir (hücreyi canlı bırakarak bozuk olan fonksiyonunu düzeltmek ya da istediğimiz proteini salgılatmak vb) veya geri döndürülemez (örn. tümör hücrelerini öldürmek) şekilde olmak üzere iki farklı amaçla uygulanır.

Geri döndürülemez elektroporasyon (IRE: Irreversible electroporation) ve elektrokemoterapide (ECT) yüksek voltajlı elektrik darbeleri (HVEP'ler) kullanılarak tümörler tedavi edilir. IRE hücre ölümünü sağlamak için 3 kV'a

¹ Uzm. Dr. Kanuni Sultan Süleyman Eğitim ve Araştırma Hastanesi, quasar145.4@outlook.com

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