BÖLÜM 6

KÖK HÜCRE ÇEŞİTLERİ VE KAYNAKLARI

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GİRİŞ

Kök hücreler, farklılaşma derecesine göre dört ana hücre tipinde sınıflandırılmaktadır. Bunlar totipotent, pluripotent, multipotent ve unipotent kök hücrelerdir. **Totipotentler,** yumurtanın döllenmesi sırasında oluşan zigot gibi tüm hücre tiplerine farklılaşma yeteneğine sahiptir. Embriyonik kök hücreler, mezoderm ve endodermden türetilen hücreler gibi **pluripotent hücreler,** neredeyse tüm hücre tiplerine farklılaşma yeteneğine sahiptir. **Multipotent kök hücreler,** kırmızı ve beyaz kan hücreleri veya trombositler haline gelebilen yetişkin kök hücreler olarak ilgili bir hücre ailesine farklılaşma yeteneğine sahiptir. **Unipotent kök hücreler** ise kas kök hücreleri gibi yalnızca kendi tipindeki hücreleri üretme yeteneğindedir.[1-3]

KÖK HÜCRE ÇEŞİTLERİ

Totipotent Kök Hücreler

Kök hücrelerin sınıflandırılması tipik olarak kökenlerine veya farklılaşma potansiyellerine dayalıdır.[2] Potansiyelleri bakımından, hiyerarşinin en tepesini, plasenta hücreleri de dahil olmak üzere tüm hücre tiplerine farklılaşabilen **totipotent** hücreler oluşturur. Kök hücreler arasında en yüksek potansiyele sahip olan totipotent kök hücreler bütün bir embriyo oluşturabilmektedir. İnsan embriyogenezisi, bir spermatozoon tarafından döllenen bir oositten kaynaklanan totipotent zigotla başlar ve daha sonra blastosiste dönüşür. Blastosist, plasentanın çoğunu oluşturan trofoblast ve uterus dokusunda implantasyonla embriyoya dönüşen iç hücre kütlesinden oluşur.[4]

Pluripotent Kök Hücreler

Pluripotent kök hücreler (PSC), endoderm, mezoderm ve ektoderm dahil olmak üzere in vitro üç germ tabakasını oluşturur. PSC'ler, hemen hemen her hücreye farklılaşabilen, sınırsız kendini yenileme potansiyeline sahip hücrelerdir. Kendini yenileme, hücre döngüsü kontrolü ile ilişkilidir. PSC'lerin hücre döngüsünü kontrol eden benzersiz mekanizmalar vardır; bu mekanizmalar sınırsız çoğalmayı ve farklılaşma kapasitesini destekler.[5]

PSC'ler, erken embriyonik dönemin farklı aşamalarından gelişirler ve kendi kendini yenileme potansiyelini korurlar. Embriyonik kök hücreler (ESC'ler) ve indüklenmiş PSC'ler (iPSC'ler)

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visi, sinir sistemi hastalıklarında umut verici bir araçtır.[85,86]

Kadavra kök hücreleri etik çıkmazda olan bir diğer kök hücre kaynağı olarak güncelliğini korumaktadır. Bilim insanları bu tip hücrelerden elde edilen yeni hücrelerin çoğalma hızlarının ölen kişilerin yaşıyla ters orantılı olduğunu bildirmektedir.[87] Kadavra kök hücreler üzerine yapılan bir çalışmada insan kadavralarındaki beyin hücrelerinden olgunlaşmamış nöral kök hücrelerinin izole edildiği rapor edilmiştir.[88] Farklı bir çalışmada kadavranın vasküler dokularının, insan kadavra mezenkimal kök hücrelerinin alternatif bir kaynağı olduğu tespit edilmiştir.[89]

İn vitro üretilen kök hücrelerin terapötik bir ajan olarak kullanıldığı klinik araştırmaların sayısı günümüzde hızla artmaktadır. Rejeneratif tıp alanında, çok sayıda hastalık, çeşitli farmakolojik veya kimyasal ajanların kök hücreleri nasıl etkilediğine dair araştırmaların odak noktasıdır.[90]

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