

BÖLÜM 11

Protein Sentezi (Translasyon Mekanizması)

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Giriş

Translasyon DNA tarafından protein sentezi için transkripsiyon ile mRNA'ya kopyalanan genetik bilginin, ribozomlarda bir protein veya polipeptid zincirine dönüştürülmesi işlemidir. Ribozom, 1960'larda keşfedilmesinden bu yana, protein sentezinin mekanizmasını aydınlatmaya çalışan birçok biyokimyasal ve biyofiziksel çalışmaya konu olmuştur. Bu çalışmaların merkezinde ribozom yapısını çözmeye girişimleri yer almıştır (1). Ribozomlar, translasyon sürecinde proteinleri sentezleyen, büyük RNA-protein komplekslerinden meydana gelmiştir. mRNA'daki genetik kodun proteine çevrilmesi, olağanüstü karmaşıklıkta bir süreçtir ve yeni yöntemler geliştirilmesine rağmen düzenlenme mekanizmalarını anlamak en büyük zorluklardan biri olmaya devam etmektedir (2).

Bu bölümde prokaryot ve ökaryot hücrelerde translasyon mekanizmasının aşamaları ve translasyon sürecindeki bazı farklılıklar hakkında kısa bilgiler verilmiştir.

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PTM'lar aynı proteinin farklı kısımları arasında veya farklı proteinler arasında birbirileri ile etkileşimde bulunarak olumlu veya olumsuz modifikasyonlara yol açabilirler. Hücrenin çoğalmasında, apoptoza uğramasında, homeostasisin sürdürülmesinde ve RAS, P53, MYC gibi kanser gelişimine sebep olabilecek birçok proteinin miktarlarının, fonksiyonlarının, lokalizasyonlarının veya hücre içi yer değiştirmelerinin modüle edilmesinin kontrolünde bu modifikasyonlar görev almaktadır. Dolayısıyla PTM'lerdeki düzensizliklerin çok ciddi patolojilere yol açacağı açabileceği görülmektedir (63).

Sonuç

Bakterilerde protein sentezinin altında yatan moleküler mekanizmaları anlamada son otuz yılda büyük ilerlemeler kaydedilmiştir ancak ökaryotik translasyon mekanizmasında açıklığa kavuşturulmamış çok daha fazla kısım bulunmaktadır (34). Bu bölümde tüm canlılarda hayati öneme sahip olan proteinlerin sentezinin translasyon aşamasındaki gerçekleşen olayların derlenip ve özetlenerek anlatılmasına ilaveten prokaryot ve ökaryotik hücrelerdeki farklılıklara değinilmeye çalışılmıştır. Bu mekanizmaların anlaşılması ve açığa çıkarılmasının gelecekte hastalıkların tanı, tedavi veya seyrinin belirlenmesinde değerli olabileceği düşünülmekte ve tedavi stratejileri oluşturulmasına katkı sunabileceğine inanılmaktadır.

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