MELATONİN VE ÇİNKONUN EGZERSİZE KATKILARI

Yazar
Oktay KAYA

Bu kitapta yer alan fikirler ve düşünceler yazara ait olup, hiçbir kurum veya kuruluşun görüşünü yansıtmamaktadır. Bu kitap "Melatonin ve Çinko Uygulanmış Ratlarda Akut Yüzme Egzersizinin Kas ve Karaciğer Glikojeni ile Plazma Laktat Düzeylerine Etkisi" adlı doktora tezinden faydalanmıştır.

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ÖNSÖZ

Yaptığımız çalışmada, aerobik solunum yapan canlılarda fizyolojk olarak da oluşabilen serbest radikallerin normalden fazla üretimi canlı organizma için kaçınılmaz olarak zararlar oluşturur. Bu nedenle özellikle son yıllarda oldukça yaygın şekilde araştırmalar yapılmaktadır. Uygun konsantrasyonlarda yararlı etkilere sahip olduğu için serbest radikallerin oksidatif stres oluşturabilecek konsantrasyonlara ulaşmadan antioksidanlar tarafından tamponlanması gerekmektedir. Çinko ve melatonin oldukça güçlü antioksidanlar olarak farklı deneysel iskemi-reperfüzyon çalışmalarında farklı doz ve sürelerde kullanılmıştır. Çinko, enzim aktivitesi ile melatonin sentezi ile ilgilidir. Melatonin, gastrointestinal sistemden çinko emilimi için düzenleyici aktiviteye sahiptir. Çinko ile epifiz bezi-melatonin sentezi arasındaki ilişki nedeniyle çinko, beyin fonksiyonlarını koruma ve yaşlanmayı geciktirme açısından önemli bir potansiyel olabilir. Melatonin düzeyi yaşamın üçüncü ayına kadar artmakta, bundan sonra melatonin ritmi belirginleşmektedir. Sirkadiyan ritmin gelişmesinde anne sütüyle beslenmenin büyük önemi vardır. Melatonin doğrudan uykuya yol açmaz ama, uyku zamanının belirlenmesinde önemlidir. Melatonin sentezlenmesi kış ve yaz aylarında daha fazla, bahar aylarında daha azdır. Melatonin hem suda hem de yağda eriyebilmektedir. Bu özelliği melatonin kan beyin bariyerini kolayca geçmesini sağlamaktadır. İntravenöz uygalanmasını takiben birkaç dakika içinde beyin dokusuna geçebilmektedir. Yapılan araştırmalar, melatoninin lipit peroksidasyonuna karşı koruyucu olduğunu göstermektedir. Melatonin, organizmaların antioksidan savunmasında rol alabilir. Örneğin, vitamin-E ve melatoninin her ikisinin de nukleusa bağlanabildiği ve alfatokoferolün de antikarsinojenik etkiye sahip olduğu gösterilmiştir. Benzer şekilde sıçanlarda, melatonin tedavisiyle DNA hasarının önlenebildiği gösterilmiştir.

Melatonin direkt serbest radikalleri gidererek, indirekt olarak da spesifik melatonin reseptörleri aracılığıyla antioksidan enzimlerin yapılmasını sağlayarak doku koruyucu özelliğini göstermektedir. Melatonin serbest radikal giderici etkileri için hiçbir bağlanma bölgesine, reseptöre, membrana ihtiyaç duymaz. Melatonin oldukça toksik olduğu bilinen hidroksil radikali, peroksinitrit anyonu ve peroksil radikallerini gidermektedir. Yardımcı olarak da süper oksit anyon radikalini giderdiği ve singlet oksijeni baskıladığı belirlenmiştir. Buna ilaveten me-

latonin, süper oksit dizmutazın mRNA seviyesini ve glutatyon peroksidaz, glutatyon redüktaz ve glukoz - 6-fosfat dehidrogenazın aktivitesini artırmaktadır.

Pineal bezden salgılanan melatonin hormonu ile fiziksel egzersiz arasında muhtemel bir ilişkiden söz edilmektedir. Hem fiziksel aktivitenin plazma melatonin düzeylerinde değişikliğe yol açabileceği, hem de melatonin uygulamasının egzersizde performansı artıran bir etkiye sahip olduğu ileri sürülmektedir. Egzersiz yaptırılan ratlarda, melatonin uygulamasının plazma laktat düzeylerinde bir azalmaya, kas ve karaciğer glikojen seviyelerinde ise bir artışa yol açtığının gösterilmesi, melatonin-egzersiz ilişkisine ilginç bir örnek olarak verilebilir. Yüzme egzersizi yaptırılan ratlarda melatonin uygulamasının lipid peroksidasyonunu önlemede başarılı olduğu gösterilmiştir. Egzersizin verimliliği açısından, kas - karaciğer glikojen depoları ve laktik asit seviyeleri önem arz etmektedir. Egzersiz yaptırılan deneklere melatonin takviyesi, egzersize bağlı oksidatif zararı vitamin-E den daha fazla giderebilmektedir. Lipid peroksidasyonundan oluşan peroksi radikalinin giderilmesini sağlamaktadır.

Melatoninin, immün sistem üzerinde bahsedilen bütün etkilerinde "çinko" temel bir aracı gibi görülmektedir. Melatonin eksikliğinin aynı zamanda çinko eksikliği ile sonuçlanması veya melatonin takviyesinin çinkonun barsaklardan emilimini artırarak çinko düzeyini yükseltmesi bu bulguların kuvvetli bir delilidir. Son olarak; çinko eksikliğinin, ratlarda plazma melatonin düzeylerinde bir azalmaya veya çinko takviyesinin aynı zamanda plazma melatonin düzeylerinde önemli artışa yol açması, melatonin ile çinko arasındaki ilişkinin tek taraflı olmadığını göstermektedir.

Önemli bir eser element olan çinko, melatonin gibi çeşitli parazitik infeksiyonlar AİDS, kanser ve yaşlanmada potansiyel değeri olabilecek bir tedavi aracı gibi görülmektedir. Çinkonun melatonin üzerindeki etkilerinin ayrıntılı şekilde ortaya konulması, belki de bahsedilen olaylarda çinko ile melatoninin kombine olarak uygulanabilirliğini gündeme getirecektir.

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