

Effects of Metal Ions in Polysaccharides on Their Antioxidant Activity and Antitumor Activity

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Abstract Lentinan, Laminarin and *Lycium barbarum* polysaccharide (LBP) were extracted by ethanol subsiding method and deproteinized by Sevage method. EDTA-2Na was used to remove the metal ions from crude polysaccharide and deproteinized polysaccharide. The antioxidant activity and antitumor activity of the polysaccharides were investigated by various assays, and compared with those of metal ions loss. The results showed that three fractions contain various intrinsic metal ions including Al, Ca, Mn with different amount. The ABTS radical scavenging, DPPH radical scavenging ability decreased after the metal ions removal. The change of hydroxyl radical scavenging ability was inconsistent among the investigated polysaccharides. Among them the activity of LBP decreased most significantly at 600 $\mu\text{g/mL}$, the scavenging activity of LBP on the ABTS radical decreased from 26.31% to 17.25% and the DPPH radical decreased from 59.80% to 38.40%. The antitumor activity against MCF-7 human breast cancer cells also decreased after the deproteinized LBP was treated by EDTA-2Na. We hence proposed that the intrinsic metal ions are a part of the active center in polysaccharides, which has an important effect on its activities.

Keywords polysaccharide; metal; antioxidant activity; antitumor activity

信 息 窗

科学家揭示间歇性禁食对健康、衰老和疾病的影响

近几年来,间歇性禁食似乎成了瘦身界的新宠,这种方法被认为不仅可以减肥、增强精力,甚至还可以延寿。是否存在足够的科学证据支持这些效果呢?前些时间,发表在《Cell Metabolism》上的一项研究,揭示了10小时的“限时饮食”对健康的改善效果。

间歇性禁食通常分为两类:一种是每日限时进食,即将进食时间段缩窄至6到8小时;另一种是所谓的“5:2 间歇性禁食”,即每周7天中有两天仅吃一顿中等量的餐食。一系列动物研究和人类研究表明,禁食与进食之间的交替有助于细胞健康,可能是通过触发一种代谢转换,即古老的应对食物短缺时期的适应方式。当细胞耗尽能快速获取基于糖的能量储备,并开始以较慢的代谢过程将脂肪转化为能量时,就会发生这种转换。

Mark Mattson 教授在文中指出,对动物和人类进行的多项研究发现,间歇性禁食可以降低血压、血脂和静息心率,也有利于大脑健康。

英国南曼彻斯特大学 NHS 信托基金会对100名超重女性进行的两项研究表明,以5:2的间歇性禁食方式进行减肥的女性与限制热量摄入的女性减掉的体重相同,但在改善胰岛素敏感性和减少腹部脂肪方面,间歇性禁食比减少热量摄入的效果更好。加拿大多伦多大学在去年4月进行的一项多中心临床试验发现,在两年内坚持热量限制饮食的220名健康、不肥胖的成年人在一系列认知测试中表现出记忆力改善的迹象。

Mattson 表示,尽管还需要做更多的研究来证明间歇性禁食对学习和记忆的影响,但如果找到了这种证据,那么禁食或模拟禁食效果的药物,可能会提供预防神经变性和痴呆症的新干预手段。

(消息来源:科技部)