

КРАТКОЕ СООБЩЕНИЕ

**«HOW DID YOU KNOW IT?» –
MASSIVE SODIUM AND POTASSIUM HAIR ACCUMULATION
AND IMMOBILITY INDUCED MUSCLE WASTING
IN MULTIPLE SCLEROSIS**

**«КАК ВЫ УЗНАЛИ?» –
МАССИВНОЕ НАКОПЛЕНИЕ НАТРИЯ И КАЛИЯ В ВОЛОСАХ
И ИММОБИЛИЗАЦИОННАЯ МЫШЕЧНАЯ АТРОФИЯ
ПРИ РАССЕЯННОМ СКЛЕРОЗЕ**

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КЛЮЧЕВЫЕ СЛОВА: волосы, натрий, калий, рассеянный склероз.

ABSTRACT. We report a massive hair accumulation of sodium and potassium due to a muscle wasting in a recently bed ridden patient having multiple sclerosis.

РЕЗЮМЕ. В работе сообщается о случае массивного накопления натрия и калия в волосах вследствие мышечной атрофии у лежачего больного с рассеянным склерозом.

The simple, but poorly understood medical fact is, that the human body muscle immobility is accompanied with the general muscle wasting (Momčilović, 2000). Recently, we have demonstrated substantial loss of muscle sodium and potassium into the hair of the depressed subjects invoked by the decrease of their muscle activity (Momčilović et al., 2012). Soon after finalizing that manuscript, a multielement profile (MP), was received for medical interpretation that was not accompanied with the standard medical history questionnaire. All what was known at that time was that the subject was a 52 years old women coded #HR_MK_061990; her hair MP was comprised of a standard set of analyzed elements by the Center for Biotic Medicine (CBM): Al, As, B, Cd, Hg, Li, Ni, Pb, Sn, V, I Ca, Co, Cr, Cu, Fe, K, Mg, Mn, Na, P, Se, Si, and Zn. The hair MP analytical procedure at

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Table 1. The imbalances in the hair multielement profile of the women #HR-MK-061990

Deficient elements ($\mu\text{g/g}$)	Excessive elements ($\mu\text{g/g}$)
Iodine (I) = 0,379 Copper (Cu) = 10,7	Aluminum (Al) = 47.1 Lithium (Li) = 0.135 Potassium (K) = 3622 Sodium (Na) = 2926 Phosphorus (P) = 215

CBM standard values for > 50 years old women: K 25-110 and Na 50 – 250 $\mu\text{g/g}$, respectively

the CBM, Moscow, Russia, an ISO certified laboratory, has been described in the full detail previously (Momčilović et al., 2006). The subject multielement profile showed a mild excess of aluminum, lithium, and phosphorus, and mild deficiency of iodine and copper, respectively (Table 1); however, her hair sodium (2926 $\mu\text{g/g}$) and potassium (3622 $\mu\text{g/g}$) were extremely high by the present CBM standards (Momčilović et al., 2006). It was the highest K and the third highest Na that we have observed in the subset of 188 women.

Empowered with our recently acquired knowledge on the changes in the intermediary K and Na metabolism of the inactive muscles of depressed subjects (Momčilović et al., 2012), our patient was warned about her excessive muscle loss, and she was suggest-

Multiple sclerosis is a chronic debilitating inflammatory disease of unknown origin that affects the central nervous system (CNS) by gradual destruction and transection of the myelin envelope of the neuron axons (demyelination) in patches throughout the brain and spinal cord, resulting in multiple and varied neurological symptoms and signs, usually with remissions and exacerbations (Compton, 2003). Oligodendrocytes that control nerve myelination are a primary suspected specific cell target. Our results showed that such impairment of the nerves is accompanied with the substantial muscle wasting. Hence, monitoring of hair sodium and potassium can be of help in assessing the clinical muscle status in the development of the multiple sclerosis disease, its temporal remission and/or exacerbation, and in relation to the administrated treatment.

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ed a thorough medical check on her neuromuscular system. Soon thereafter, the lady who managed the collection of the hair sample (and who missed to send us the medical questionnaire), called and asked on how did we knew that she was bedridden. Indeed, she was diagnosed with the magnetic resonance to have multiple sclerosis (MS) eleven years ago, was treated according to the current medical practice (Beers, Berkow, 1999) but, over the years, her clinical condition fared from bad to the worse, and she got bed ridden because of muscle weakness just about the time when her hair was collected. It should be noted that over the years she has got severely obstipated (a common MS complication), and what would indicate the involvement of the nerves controlling the bowel muscles peristaltic, and beyond those of skeletal muscles.

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