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„Selenium supplementation and exercise: effect on oxidant stress in overweight adults.“

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Selen-Supplementierung und Sport: Wirkung auf oxidativen Stress bei übergewichtigen Erwachsenen.

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„Συμπληρώματα σεληνίου και άσκηση: επίπτωση στο οξειδωτικό στρες σε υπέρβαρους ενήλικες.“

Ⓕ

Supplémentation en sélénium et exercice physique : effet sur le stress oxydatif chez les adultes obèses.

Ⓒ

„Suplementace selenem a cvičení: účinek na oxidační stres u dospělých s nadváhou.,,

[Obesity \(Silver Spring\)](#). 2012 Apr;20(4):794-801. doi: 10.1038/oby.2011.83. Epub 2011 May 19.

Selenium supplementation and exercise: effect on oxidant stress in overweight adults.

[Savory LA](#), [Kerr CJ](#), [Whiting P](#), [Finer N](#), [McEneny J](#), [Ashton T](#).

Source Department of Sport and Exercise Sciences, University of Bedfordshire, Bedford, UK. louise.savory@nhs.net

Abstract

Both obesity and acute high-intensity exercise increase oxidant stress levels. This study investigates whether selenium (Se) supplementation could be a potential effective therapy to reduce obesity-associated oxidant stress and exercise-induced oxidant stress. Ten normal-weight (NW) (22.80 ± 0.41 kg/m²) and ten overweight (OW) healthy subjects (28.00 ± 0.81 kg/m²) were assessed during a randomized double-blind Se supplementation study (200 µg sodium selenite/day for 3 weeks) with a 3-week placebo control and inversion of treatment periods. Blood levels of lipid hydroperoxide (LH), superoxide dismutase (SOD), erythrocyte glutathione (GSH), and total antioxidant status (TAS), were measured at rest, pre-, and postexercise (30 min 70% VO₂ max before and after treatment (pretreatment (week 0 and 12) and post-treatment (week 3 or 15))). At rest, compared to placebo, Se supplementation had no significant effect on LH, SOD, GSH, and TAS levels. However, Se supplementation decreased LH levels in the OW group, immediately postexercise (-0.25 ± 0.12 µmol/l, $P = 0.05$) compared to placebo treatment. Postexercise, with or without Se supplementation, no changes in TAS, SOD, and GSH levels were observed in both the NW and OW group. **This study has highlighted a potential benefit of Se in reducing LH levels postexercise in OW individuals. Given that oxidant stress is a predictor of coronary events, it is imperative to better understand oxidant stress-related responses to lifestyle factors (in particular "high-risk" population groups) and potential antioxidant therapy.**

PMID: 21593809

Ⓒ

„Antioxidant intake and pancreatic cancer risk: The Vitamins and Lifestyle (VITAL) Study.“

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Einnahme von Antioxidanzien und Pankreaskarzinomrisiko: Die Vitamine und Lifestyle (VITAL) Studie.

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Πρόσληψη αντιοξειδωτικών και κίνδυνος καρκίνου στο πάγκρεας; The Vitamins and Lifestyle (VITAL) Study.

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Prise d'anti-oxydant et risque de cancer du pancréas : l'étude sur les vitamines et le style de vie (VITAL).

Ⓒ

„Příjem antioxidantů a riziko rakoviny slinivky břišní: Studie vitamínů a životního stylu (VITAL).„

Cancer. 2012 Dec 21. doi: 10.1002/cncr.27936. [Epub ahead of print]

Antioxidant intake and pancreatic cancer risk: The Vitamins and Lifestyle (VITAL) Study.

Han X, Li J, Brasky TM, Xun P, Stevens J, White E, Gammon MD, He K.

Source Department of Nutrition, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina; American Cancer Society, Atlanta, Georgia. xuesong.han@cancer.org.

BACKGROUND:

Oxidative stress causes damage to many components of human cells (ie, proteins, lipids, and DNA) and is involved in carcinogenesis. Nutrients with antioxidant properties may protect against oxidative stress. In this study, the authors examined the intake of antioxidants from diet and supplements in relation to pancreatic cancer risk among participants of the Vitamins and Lifestyle (VITAL) Study.

METHODS:

The participants included 77,446 men and women ages 50 to 76 years who were residents of western Washington State and who completed a baseline questionnaire between 2000 and 2002. Participants reported usual diet over the past year and use of supplements over the past 10 years in addition to demographic and lifestyle factors. During a median follow-up of 7.1 years, 184 participants developed pancreatic adenocarcinoma. Cox proportional hazards models were used to estimate multivariable-adjusted hazard ratios (HRs) and 95% confidence intervals (CIs) for 7 antioxidants: β -carotene, lutein plus zeaxanthin, lycopene, vitamin C, vitamin E, selenium, and zinc.

RESULTS:

An inverse association was observed between dietary selenium and the risk of pancreatic cancer (medium vs low intake: HR, 0.58; 95% CI, 0.35-0.94; high vs low intake: HR, 0.44; 95% CI, 0.23-0.85; P(trend) = .01); however, when supplemental and dietary exposures were combined, the association was no longer statistically significant.

CONCLUSIONS:

Dietary selenium intake was inversely associated with the risk of pancreatic cancer, and the observed association was attenuated by selenium supplementation.

Cancer 2012. © 2012 American Cancer Society.

PMID: 23280534

GB

Selenoproteins and the aging brain.

DE

Selenoproteine und das alternde Gehirn.

GR

Σεληνοπρωτεΐνες και γηράσκων εγκέφαλος.

FR

Les sélénoprotéines et le cerveau vieillissant.

CZ

„Selenoproteiny a stárnoucí mozek.“

Selenoproteins and the aging brain.

Zhang S, Rocourt C, Cheng WH.

Source Department of Nutrition and Food Science, University of Maryland, 0112 Skinner Building, College Park, MD 20742, USA.

Selenium (Se) is an essential trace mineral mediating its biological function primarily through selenoproteins. **Accumulated lines of evidence indicate important roles of selenoproteins in the maintenance of optimal brain functions via redox regulation.** Decreased expression of several selenoproteins is associated with the pathologies of a few age-associated neurodisorders, including Parkinson's disease, Alzheimer's disease and epilepsy. Recent advances using genetically manipulated mouse models demonstrate that **selenoproteins offer protection against neurodegeneration primarily through redox regulation.** Therapies targeting specific selenoproteins influencing redox regulation **could delay the onset of neurodisorders, improve quality of life of patients already affected,** and perhaps rescue patients with certain diseases by using novel gene therapies.

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PMID: 20219520

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Selenium and selenoproteins in health and disease.

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Selen und Selenoproteine bei Gesundheit und Krankheit.

Ⓖ

Ο ρόλος του σεληνίου και των σεληνοπρωτεϊνών στην υγεία και την ασθένεια.

Ⓕ

Le sélénium et les sélénoprotéines chez l'individu sain et malade.

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Selen a selenoproteiny ve zdraví a v nemoci.

[Antioxid Redox Signal.](#) 2010 Apr 1;12(7):793-5. doi: 10.1089/ars.2009.2973.

Selenium and selenoproteins in health and disease.

[Papp LV](#), [Holmgren A](#), [Khanna KK](#).

Abstract

The beneficial role of the trace element selenium (Se) in human health has been known for several decades and is attributed both to low-molecular-weight Se compounds and to its presence within 25 selenoproteins in the form of the amino acid selenocysteine (Sec). Incorporation of Sec into selenoproteins involves decoding of the UGA codon. This process requires multiple features, such as the Sec-insertion sequence (SECIS) element and protein factors, including a specific elongation factor EFSec and the SECIS-binding protein 2, SBP2. Although many selenoproteins remain functionally uncharacterized, some of their known functions include redox regulation of intracellular signaling, redox homeostasis, and thyroid hormone metabolism. Pathologically, reduced expression of selenoproteins has been directly linked with the congenital muscle disease referred to as selenoprotein N (SEPN)-related myopathy and with thyroid-hormone metabolism defects (deficiency of deiodinases due to genetic defects in SBP2). **From a broader, less well defined aspect, selenium compounds and selenoproteins have been linked to prevention of some forms of cancer, Alzheimer's disease, cardiovascular disease, and life span.** This forum summarizes recent advances in our understanding of important roles of selenium, selenoproteins, and factors involved in selenoprotein synthesis in health and disease and discusses potential targets for therapy.

PMID: 19905883

Ⓒ

„Selenium intake, mood and other aspects of psychological functioning.“

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Selenaufnahme, Stimmung und andere Aspekte der psychischen Funktion.

Ⓒ

Πρόσληψη σεληνίου, ψυχική διάθεση και άλλες μορφές ψυχικής λειτουργίας.

Ⓒ

Prise de sélénium, humeur et aspects du fonctionnement psychologique.

Ⓒ

Příjem selenu, nálada a další hlediska psychologických funkcí.

[Nutr Neurosci](#). 2002 Dec;5(6):363-74.

Selenium intake, mood and other aspects of psychological functioning.

[Benton D.](#)

Source Department of Psychology, University of Wales Swansea, Swansea SA2 8PP, Wales, UK. d.benton@swansea.ac.uk

Abstract

Selenium is an essential trace element although the level of selenium in food items reflects the soil in which they were grown and thus varies markedly between different parts of the world. The metabolism of selenium by the brain differs from other organs in that at times of deficiency the brain retains selenium to a greater extent. The preferential retention of selenium in the brain suggests that it plays important functions. To date mood is the clearest example of an aspect of psychological functioning that is modified by selenium intake. **Five studies have reported that a low selenium intake was associated with poorer mood.** The underlying mechanism is unclear although a response to supplementation was found with doses greater than those needed to produce maximal activity of the selenoprotein glutathione peroxidase. Although the functions of many selenoproteins are unknown some play important roles in anti-oxidant mechanisms. As there are suggestions that oxidative injury plays a role in normal aging, schizophrenia, Parkinson's and Alzheimer's disease, the possible role of selenium is considered. Although there is evidence that supplementation with anti-oxidant vitamins shown some promise with Alzheimer's patients, and in preventing the development of tardive dyskinesia in schizophrenics taking neuroleptics, a role for selenium has been little considered.

PMID: 12509066

GB

„Effect of vitamin E and selenium supplementation on oxidative stress status in pulmonary tuberculosis patients.“

DE

Wirkung von Vitamin E- und Selen-Supplementierung auf den oxidativen Stresstatus bei Patienten mit Lungentuberkulose.

GR

„Αποτέλεσμα των συμπληρωμάτων Βιταμίνης Ε και Σεληνίου στο οξειδωτικό στρες σε ασθενείς με πνευμονική φυματίωση.“

FR

Effet d'une supplémentation en vitamine E et en sélénium sur l'état de stress oxydatif chez les patients atteints d'une tuberculose pulmonaire.

CZ

Účinek vitamínu E a suplementace selenem na hladinu oxidačního stresu u pacientů s plicní tuberkulózou.

Respirology. 2008 Mar;13(2):294-8. doi: 10.1111/j.1440-1843.2007.01200.x.

Effect of vitamin E and selenium supplementation on oxidative stress status in pulmonary tuberculosis patients.

Seyedrezazadeh E, Ostadrahimi A, Mahboob S, Assadi Y, Ghaemmagami J, Pourmogaddam M.

Source Faculty of Health and Nutrition, Tabriz University of Medical Sciences, Tabriz Azarbayegan Shargi, Iran. esrz80@yahoo.com

BACKGROUND AND OBJECTIVE:

Increased production of reactive oxygen species secondary to phagocyte respiratory burst occurs in pulmonary tuberculosis (TB). The present study evaluated the efficacy of vitamin E-selenium supplementation on oxidative stress in newly diagnosed patients treated for pulmonary TB.

METHODS:

A double-blind, placebo-controlled trial including patients with newly diagnosed TB was conducted. The intervention group (n = 17) received vitamin E and selenium (vitamin E: 140 mg alpha-tocopherol and selenium: 200 microg) and the control group (n = 18) received placebo. Both groups received standard anti-TB treatment. Assessment of micronutrient levels, oxidative markers and total antioxidant capacity were carried out at baseline and 2 months after the intervention.

RESULTS: Malondialdehyde levels were significantly reduced in the intervention group (P = 0.01), while there was minimal reduction in the control group. The mean plasma level of total antioxidants was increased significantly (P = 0.001) in both the intervention and the control groups.

CONCLUSION: A 2-month intervention with vitamin E and selenium supplementation reduces oxidative stress and enhances total antioxidant status in patients with pulmonary TB treated with standard chemotherapy.

PMID: 18339032

Ⓒ

The argument for increasing selenium intake.

Ⓓ

Das Argument für eine erhöhte Selenaufnahme.

Ⓔ

Το επιχείρημα για αύξηση της πρόσληψης σεληνίου.

Ⓕ

L'argument prônant d'accroître la prise de sélénium.

Ⓖ

Argument pro zvýšení příjmu selenu.

[Proc Nutr Soc.](#) 2002 May;61(2):203-15.

The argument for increasing selenium intake.

[Rayman MP](#), [Rayman MP](#).

Source Centre for Nutrition and Food Safety, School of Biomedical and Life Sciences, University of Surrey, Guildford GU2 7XH, UK. m.rayman@surrey.ac.uk

Abstract

The essential trace mineral, Se, is of fundamental importance to human health. As a constituent of selenoproteins it plays both structural and enzymic roles, in the latter context being best known as an antioxidant and catalyst for the production of active thyroid hormone. While Se-deficiency diseases have been recognised for some time, evidence is mounting that less-overt deficiency can also cause adverse health effects and furthermore, that supra-nutritional levels of Se may give additional protection from disease. In the context of these effects, low or diminishing Se status in some parts of the world, notably in some European countries such as the UK, is giving cause for concern. While deficiency has an adverse effect on immunocompetence, Se supplementation appears to enhance the immune response. Se appears to be a key nutrient in counteracting certain viral infections; thus, in a Se-deficient host the benign coxsackie virus becomes virulent, causing heart damage, the influenza virus causes more serious lung pathology and HIV infection progresses more rapidly to AIDS. Long recognised as essential for successful animal reproduction, Se is required for human sperm maturation and sperm motility and may reduce the risk of miscarriage. Deficiency has been linked to adverse mood states. Findings have been equivocal in linking Se to cardiovascular disease risk, although other conditions involving oxidative stress and inflammation have shown some association with Se status. **There is growing evidence that higher Se intakes are associated with reduced cancer risk. While persuasive evidence already exists to suggest that additional Se would be beneficial in some health conditions, results from intervention trials underway or planned have the potential to reinforce or refute the argument for increasing Se intake.** PMID: 12133202

Ⓒ

Selenium: its role as antioxidant in human health.

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Selen: seine Rolle als Antioxidans in der menschlichen Gesundheit.

Ⓖ

Σελήνιο: ο ρόλος του ως αντιοξειδωτικό στην ανθρώπινη υγεία.

Ⓕ

Le sélénium : son rôle en tant qu'anti-oxydant dans la santé humaine.

Ⓒ

Selen: jeho úloha antioxidantu v lidském zdraví.

[Environ Health Prev Med.](#) 2008 Mar;13(2):102-8. doi: 10.1007/s12199-007-0019-4.
Epub 2008 Feb 28.

Selenium: its role as antioxidant in human health.

[Tinggi U.](#)

Source Centre for Public Health Sciences, Queensland Health Scientific Services, 39 Kessels Road, Coopers Plains, QLD 4108, Australia. ujang_tinggi@health.qld.gov.au

Abstract

Selenium (Se) is an essential trace element, and its low status in humans has been linked to increased risk of various diseases, such as cancer and heart disease. In recent years, Se research has attracted tremendous interest because of **its important role in antioxidant selenoproteins for protection against oxidative stress initiated by excess reactive oxygen species (ROS) and reactive nitrogen species (NOS)**. The synthesis of selenoproteins requires a unique incorporation of amino acid selenocysteine (Sec) into proteins directed by the UGA codon, which is also a termination codon. Interest in Se research has led to the discovery of at least 30 selenoproteins; however, the biochemical functional roles of some of these selenoproteins are still unknown. Besides in the form of selenoproteins, Se can exist in many different chemical forms in biological materials either as organic Se compounds, such as selenomethionine and dimethylselenide, and inorganic selenites and selenates. In foods, Se is predominantly present as selenomethionine, which is an important source of dietary Se in humans, and also as a chemical form that is commonly used for Se supplements in clinical trials. Concern for potential deficiency diseases associated with low Se status has led to the establishment of the recommended daily requirements for Se in many countries. However, excess Se intakes through supplementation and its potential misuse as health therapy could also pose a risk of adverse health effects if its use is not properly regulated.

PMID: 19568888

GB

„Selenoproteins and protection against oxidative stress: selenoprotein N as a novel player at the crossroads of redox signaling and calcium homeostasis.“

DE

„Selenoproteine und Schutz gegen oxidativen Stress: Selenoprotein N als neuartiger Akteur am Scheideweg von Redox-Signalisierung und Calcium-Homöostase.“

GR

Σεληνοπρωτεΐνες και προστασία ενάντια στο οξειδωτικό στρες: η σεληνοπρωτεΐνη N ως καινοτόμος παράγοντας στο σταυροδρόμι της μεταγωγής ενδοκυττάρων σημάτων και της ομοιόστασης του ασβεστίου.

FR

Les sélénoprotéines et la protection contre le stress oxydatif : la sélénoprotéine N, nouvel acteur au carrefour de la signalétique de l'oxydoréduction et de l'homéostasie calcique.

CZ

„Selenoproteiny a ochrana proti oxidačnímu stresu: selenoprotein N jako nový hráč na pomezí redoxní signalizace a homeostázy vápníku.“

[Free PMC Article](#)

[Antioxid Redox Signal.](#) 2010 Apr 1;12(7):893-904. doi: 10.1089/ars.2009.2890.

**Selenoproteins and protection against oxidative stress:
selenoprotein N as a novel player at the crossroads of redox
signaling and calcium homeostasis.**

[Arbogast S](#), [Ferreiro A](#).

Source INSERM U787, Institut de Myologie, Paris, France.

Healthy cells continually produce low levels of reactive oxygen species (ROS), which are buffered by multiple antioxidant systems. Imbalance between ROS production and elimination results in oxidative stress, which has been implicated in aging and in numerous human diseases, including cancer and diabetes.

Selenoproteins are a family of proteins that contain the amino acid selenocysteine, encoded by an in-frame UGA. Those selenoproteins whose function is identified are catalytically active in redox processes, representing one of the main enzymatic antioxidant systems and important mediators of the beneficial role of selenium in human health. Nevertheless, the function of most selenoproteins remains unknown; this included Selenoprotein N (SelN), the only selenoprotein directly associated with a human genetic disease. Mutations of the SelN gene cause SEPN1-related myopathy, a particular early-onset muscle disorder. Recent studies have identified SelN as a key protein in cell protection against oxidative stress and redox-related calcium homeostasis. Furthermore, an effective ex vivo treatment of SelN deficiency has been identified, paving the way to a clinical therapy. In this review we discuss the physiological and pathophysiological role of SelN and the interest of SEPN1-related myopathy as a model paradigm to understand and target therapeutically other selenoproteins involved in human health and disease.

PMID: 19769461

Ⓒ

„Clinical and biochemical effects of coenzyme Q(10), vitamin E, and selenium supplementation to psoriasis patients.“

Ⓓ

Klinische und biochemische Wirkung von Coenzym- Q(10)-, Vitamin-E- und Selen-Supplementierung auf Psoriasispatienten.

Ⓖ

„Κλινικά και βιοχημικά αποτελέσματα των συμπληρωμάτων συνένζυμου Q(10), Βιταμίνης E, και σεληνίου σε ασθενείς με ψωρίαση.“

Ⓕ

Effets cliniques et biochimiques d'une supplémentation en co-enzyme Q10, vitamine E et sélénium sur les patients atteints d'un psoriasis.

Ⓒ

Klinické a biochemické účinky koenzymu Q(10), vitamínu E a suplementace selenu u pacientů s lupénkou.

Nutrition. 2009 Mar;25(3):295-302. doi: 10.1016/j.nut.2008.08.015. Epub 2008 Nov 28.

Clinical and biochemical effects of coenzyme Q(10), vitamin E, and selenium supplementation to psoriasis patients.

Kharaeva Z, Gostova E, De Luca C, Raskovic D, Korkina L.

Source Immunology Department, Medical University, Nal'chik, Russian Federation.

Abstract

OBJECTIVE:

The aim of the present study was to evaluate clinical effects of supplementation with antioxidants to patients with severe erythrodermic (EP) and arthropathic (PsA) forms of psoriasis.

METHODS:

Fifty-eight patients were hospitalized, treated by conventional protocols, and randomly assigned to four groups. Groups EP1 and PsA1 were supplemented with coenzyme Q(10) (ubiquinone acetate, 50 mg/d), vitamin E (natural alpha-tocopherol, 50 mg/d), and selenium (aspartate salt, 48 mug/d) dissolved in soy lecithin for 30-35 d. Groups EP2 and PsA2 (placebo) received soy lecithin. Clinical conditions were assessed by severity parameters. Markers of oxidative stress included superoxide production, copper/zinc-superoxide dismutase, and catalase activities in the circulating granulocytes, in the affected epidermis, and plasma levels of nitrites/nitrates.

RESULTS:

At baseline patients had an increased superoxide release from granulocytes (10.0 +/- 0.5, 2.9 +/- 0.2, and 1.5 +/- 0.1 nmol/L per 10(6) cells/h for EP, PsA, and donors, respectively), increased copper/zinc-superoxide dismutase and catalase activities in granulocytes in EP patients and decreased in PsA patients, decreased activity of copper/zinc-superoxide dismutase (0.3 +/- 0.0, 1.8 +/- 0.1, and 2.2 +/- 0.2 U/mg protein for EP, PsA, and donors, respectively), and altered activity of catalase in psoriatic epidermis. Plasma levels of nitrites/nitrates were greater than

normal in psoriatic patients. Supplementation resulted in significant improvement of clinical conditions, which corresponded to the faster versus placebo normalization of the oxidative stress markers.

CONCLUSION:

Supplementation with antioxidants coenzyme Q(10), vitamin E, and selenium could be feasible for the management of patients with severe forms of psoriasis.

PMID: 19041224

Ⓒ

Selenium and asthma.

Ⓓ

Selen und Asthma.

Ⓖ

Σελήνιο και άσθμα.

Ⓕ

Le sélénium et l'asthme.

Ⓒ

Selen a astma.

[Mol Aspects Med.](#) 2012 Feb;33(1):98-106. doi: 10.1016/j.mam.2011.10.003. Epub 2011 Oct 15.

Selenium and asthma.

[Norton RL](#), [Hoffmann PR](#).

Source Department of Cell and Molecular Biology, John A Burns School of Medicine, University of Hawaii, Honolulu, HI 96813, USA.

Se is a potent nutritional antioxidant important for various aspects of human health. Because asthma has been demonstrated to involve increased oxidative stress, levels of Se intake have been hypothesized to play an important role in the pathogenesis of asthma. However, significant associations between Se status and prevalence or severity of asthma have not been consistently demonstrated in human studies. This highlights both the complex etiology of human asthma and the inherent problems with correlative nutritional studies. In this review, the different findings in human studies are discussed along with results from limited intervention studies. Mouse models of asthma have provided more definitive results suggesting that the benefits of Se supplementation may depend on an individual's initial Se status. This likely involves T helper cell differentiation and the mechanistic studies that have provided important insight into the effects of Se levels on immune cell function are summarized. Importantly, the benefits and adverse effects of Se supplementation must both be considered in using this nutritional supplement for treating asthma. With this in mind new approaches are discussed that may provide more safe and effective means for using Se supplementation for asthma or other disorders involving inflammation or immunity.

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PMID: 22024250