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Dopamine D2 receptor genotype is associated with increased mortality at a 10-year follow-up of alcohol-dependent individuals.

Berggren U; Fahlke C; Berglund KJ; Wadell K; Zetterberg H; Blennow K et al. *Alcohol and Alcoholism* 45(1): 1-5, 2010. (24 refs.)

Aims: Because the TAQ1 A1 allele may be associated with alcohol-related medical illnesses, and medical illnesses in alcohol-dependent individuals are associated with increased mortality, we test the hypothesis that the TAQ1 A1 allele of the DRD2 gene is associated with increased mortality in alcohol-dependent individuals. **Methods:** Following an index treatment episode, a 10-year follow-up study in 366 alcohol-dependent individuals was performed. The TAQ1 A1/A2 DRD2 genotype and allele frequencies were compared between those deceased and those still living at the 10-year point. In addition, the genotype and allele frequencies of these alcohol-dependent individuals were compared to that in 578 control subjects. **Results:** The prevalence of the A1 allele differed between the deceased and living patients and the controls: 47% of the deceased were A1+, compared to 37% of the living patients and 32% of the controls. The frequency of the TAQ1 A1/A2 genotype also differed between the groups. Thus, 43% had the A1/A2 genotype in comparison with 32% in the living patients and 29% in the controls. The TAQ 1 A1 allele frequency differed between the groups. The frequency of A1 allele was 25% in the deceased patients compared to 21% in the living patients and 17% in the controls. **Conclusion:** The TAQ I A1 allele of the DRD2 gene (or DRD2 gene region) was associated with increased mortality over a 10-year period in alcohol-dependent individuals. Copyright 2010, Oxford University Press.

Endogenous opiates and behavior: 2008. (review).

Bodnar RJ. *Peptides* 30(12): 2432-2479, 2009. (1121 refs.)

This paper is the 31st consecutive installment of the annual review of research concerning the endogenous opioid system. It summarizes papers published during 2008 that studied the behavioral effects of molecular, pharmacological and genetic manipulation of opioid

peptides, opioid receptors, opioid agonists and opioid antagonists. The particular topics that continue to be covered include the molecular-biochemical effects and neurochemical localization studies of endogenous opioids and their receptors related to behavior (Section 2), and the roles of these opioid peptides and receptors in pain and analgesia (Section 3); stress and social status (Section 4); tolerance and dependence (Section 5); learning and memory (Section 6); eating and drinking (Section 7); alcohol and drugs of abuse (Section 8); sexual activity and hormones, pregnancy, development and endocrinology (Section 9); mental illness and mood (Section 10); seizures and neurologic disorders (Section 11); electrical-related activity and neurophysiology (Section 12); general activity and locomotion (Section 13); gastrointestinal, renal and hepatic functions (Section 14); cardiovascular responses (Section 15); respiration and thermoregulation (Section 16); and immunological responses (Section 17). Copyright 2009, Elsevier Science.

Episodic memory in detoxified alcoholics: Contribution of grey matter microstructure alteration.

Chanraud S; Leroy C; Martelli C; Kostogianni N; Delain F; Aubin HJ et al. *PLoS one* 4(8): e-6786, 2009. (62 refs.)

Even though uncomplicated alcoholics may likely have episodic memory deficits, discrepancies exist regarding to the integrity of brain regions that underlie this function in healthy subjects. Possible relationships between episodic memory and 1) brain microstructure assessed by magnetic resonance diffusion tensor imaging (DTI), 2) brain volumes assessed by voxel-based morphometry (VBM) were investigated in uncomplicated, detoxified alcoholics. Diffusion and morphometric analyses were performed in 24 alcohol dependent men without neurological or somatic complications and in 24 healthy men. The mean apparent coefficient of diffusion (ADC) and grey matter volumes were measured in the whole brain. Episodic memory performance was assessed using a French version of the Free and Cued Selective Reminding Test (FCSRT). Correlation analyses between verbal episodic memory, brain

microstructure, and brain volumes were carried out using SPM2 software. In those with alcohol dependence, higher ADC was detected mainly in frontal, temporal and parahippocampal regions, and in the cerebellum. In alcoholics, regions with higher ADC typically also had lower grey matter volume. Low verbal episodic memory performance in alcoholism was associated with higher mean ADC in parahippocampal areas, in frontal cortex and in the left temporal cortex; no correlation was found between regional volumes and episodic memory scores. Regression analyses for the control group were not significant. These findings support the hypothesis that regional microstructural but no macrostructural alteration of the brain might be responsible, at least in part, for episodic memory deficits in alcohol dependence. Copyright 2009, Public Library of Science.

Anticonvulsant drugs in cocaine dependence: A systematic review and meta-analysis. (review).

Alvarez Y; Farre M; Fonseca F; Torrens M. *Journal of Substance Abuse Treatment* 38(1): 66-73, 2010. (32 refs.)

A systematic review and meta-analysis according to the methodology developed by the Cochrane Collaboration and the Quality of Reporting of Meta-Analyses statement based on randomized controlled trials to evaluate the efficacy of anticonvulsants in subjects with cocaine dependence were performed. Fifteen randomized, double-blind, placebo-controlled clinical trials involving 1,236 patients were included. Two outcome measures were evaluated: retention in the anticonvulsant treatment (compared to the placebo treatment) and the subsequent cocaine use, measured by urinalysis results. The efficacy of the seven anticonvulsant drugs analyzed was not homogenous. On average, 50% of the enrolled participants were lost to follow-up. Treatments did not show an improvement in subject retention compared to placebo. Overall, the number of cocaine-positive urine samples was close to statistical significance (95% confidence interval = 0.85-1.06) compared to placebo. Available clinical trials indicate that there is insufficient evidence to justify the use of anticonvulsant drugs in treating cocaine dependence. Copyright 2010, Elsevier Science.

Acute neurotoxicity after yohimbine ingestion by a body builder.

Giampreti A; Lonati D; Locatelli C; Rocchi L; Campailla MT. *Clinical Toxicology* 47(8): 827-829, 2009. (14 refs.)

Yohimbine is an alkaloid obtained from the *Corynanthe yohimbe* tree and other biological sources.

Yohimbine is currently approved in the United States for erectile dysfunction and has undergone resurgence in street use as an aphrodisiac and mild hallucinogen. In recent years yohimbine use has become common in body-building communities for its presumed lipolytic and sympathomimetic effects. We describe a 37-year-old bodybuilder in which severe acute neurotoxic effects occurred in 2 h after yohimbine ingestion. The patient presented with malaise, vomiting, loss of consciousness, and repeated seizures after ingestion of 5 g of yohimbine during a body-building competition in a gymnasium. His Glasgow Coma Score was 3, requiring orotracheal intubation. Two hours after admission, vital signs were blood pressure 259/107 mmHg and heart rate 140 beats/min. Treatment with furosemide, labetalol, clonidine, and urapidil and gastrointestinal decontamination were performed. Twelve hours later the patient was extubated with normal hemodynamic parameters and neurological examination. The yohimbine blood levels at 3, 6, 14, and 22 h after ingestion were 5,240; 2,250; 1,530; and 865 ng/mL, respectively, with a mean half-life of 2 h. Few data are available about yohimbine toxicity and the related blood levels. This is a case of a large ingestion of yohimbine in which severe hemodynamic and neurological manifestations occurred and elevated blood levels of yohimbine were detected. Copyright 2009, Informa Healthcare.

Is opium addiction a risk factor for deep vein thrombosis? A case-control study.

Masoomi M; Ramezani MA; Shahriari S; Shahesmaeeli A; Mirzaeepour F. *Blood Coagulation & Fibrinolysis* 21(2): 109-112, 2010. (28 refs.)

The objective of the present study was to investigate the association between opioid addiction and deep vein thrombosis (DVT) and whether opioid addiction is a risk factor of DVT. This case-control study was conducted in Kerman, Iran in 2008. The cases were selected among the patients hospitalized because of DVT. The controls were recruited from the same hospital from internal wards. Opioid addiction was investigated by physician's interview based on Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) criteria. Logistic regression modeling was carried out for statistical analysis. The crude odds ratio (OR) of opioid addiction for DVT was 4.25 (95% confidence interval=2.6-6.9). However, multivariate logistic regression analysis revealed that opioid addiction was not an independent risk factor for DVT, OR 0.56 (0.1-3). The method of opioid usage - oral or inhaled and injected OR 6.3 (1.41-28.3) and previous surgery in the last 3 months before the study, OR 3.1 (1.36-7), were significant independent risk

factors for incidence of DVT. Opioid addiction per se was not a risk factor for DVT, whereas the method of its use especially injection was found to be independent risk factor for DVT. Our results suggested the prophylactic treatment of anticoagulant for intravenous drug abuser is considerable. Copyright 2010, Lippincott, Williams & Wilkins.

The comparative toxicology and major organ pathology of fatal methadone and heroin toxicity cases.

Darke S; Duflou J; Torok M. *Drug and Alcohol Dependence* 106(1): 1-6, 2010. (23 refs.)

In order to determine the comparative toxicology and systemic disease of cases of death due to methadone and heroin toxicity, 1193 coronial cases of opioid overdose that occurred in New South Wales, Australia between 1 January 1998 and 31 December 2007 were inspected. These comprised 193 cases in which cause of death involved methadone toxicity (METH) and 1000 cases in which cause of death involved heroin toxicity in the absence of methadone (HER). METH cases were significantly more likely to have benzodiazepines (63.7% vs. 32.2%), and less likely to have alcohol (23.6% vs. 42.7%) detected. METH cases were significantly more likely to be diagnosed with pre-existing systemic pathology (94.3% vs. 79.9%), and multiple organ system pathology (68.8% vs. 41.4%). Specifically, METH cases were more likely to have cardiac (58.9% vs. 34.5%), pulmonary (53.6% vs. 30.9%), hepatic (80.7% vs. 62.8%) and renal (25.0% vs. 9.5%) disease. Given the notable differences in toxicology and disease patterns, great caution appears warranted in prescribing benzodiazepines to methadone users, and regular physical examinations of methadone treatment patients would appear clinically warranted. Copyright 2010, Elsevier Science.

Initiating moderate to heavy alcohol use predicts changes in neuropsychological functioning for adolescent girls and boys.

Squeglia LM; Spadoni AD; Infante MA; Myers MG; Tapert SF. *Psychology of Addictive Behaviors* 23(4): 715-722, 2009. (67 refs.)

This study prospectively examines the influence of alcohol on neuropsychological functioning in boys and girls characterized prior to initiating drinking (N = 76, ages 12-14). Adolescents who transitioned into heavy (n = 25; 11 girls, 14 boys) or moderate (n = 11; 2 girls, 9 boys) drinking were compared with matched controls who remained nonusers throughout the similar to 3-year follow-up period (N = 40; 16 girls, 24 boys). For girls, more past year drinking days

predicted a greater reduction in visuospatial task performance from baseline to follow-up, above and beyond performance on equivalent measures at baseline (R-2 Delta = 10%, p < .05), particularly on tests of visuospatial memory (R-2 Delta = 8%, p < .05). For boys, a tendency was seen for more past year hangover symptoms to predict worsened sustained attention (R-2 Delta = 7%. p < .05). These preliminary longitudinal findings suggest that initiating moderately heavy alcohol use and incurring hangover during adolescence may adversely influence neurocognitive functioning. Neurocognitive deficits linked to heavy drinking during this critical developmental period may lead to direct and indirect changes in neuromaturational course, with effects that would extend into adulthood. Copyright 2009, Educational Publishing Foundation.

White-matter abnormalities in brain during early abstinence from methamphetamine abuse.

Tobias MC; O'Neill J; Hudkins M; Bartzokis G; Dean AC; London ED. *Psychopharmacology* 209(1): 13-24, 2010. (67 refs.)

Previous studies revealed microstructural abnormalities in prefrontal white matter and corpus callosum of long-term abstinent chronic methamphetamine abusers. In view of the importance of the early abstinence period in treatment retention, we compared 23 methamphetamine-dependent subjects abstinent from methamphetamine for 7-13 days with 18 healthy comparison subjects. As certain metabolic changes in the brain first manifest after early abstinence from methamphetamine, it is also possible that microstructural white-matter abnormalities are not yet present during early abstinence. Using diffusion tensor imaging at 1.5 T, fractional anisotropy (FA) was measured in prefrontal white matter at four inferior-superior levels parallel to the anterior commissure-posterior commissure (AC-PC) plane. We also sampled FA in the corpus callosum at the midline and at eight bilateral, fiber-tract sites in other regions implicated in effects of methamphetamine. The methamphetamine group exhibited lower FA in right prefrontal white matter above the AC-PC plane (11.9% lower; p = 0.007), in midline genu corpus callosum (3.9%; p = 0.019), in left and right midcaudal superior corona radiata (11.0% in both hemispheres, p's = 0.020 and 0.016, respectively), and in right perforant fibers (7.3%; p = 0.025). FA in left midcaudal superior corona radiata was correlated with depressive and generalized psychiatric symptoms within the methamphetamine group. The findings support the idea that methamphetamine abuse produces microstructural

abnormalities in white matter underlying and interconnecting prefrontal cortices and hippocampal formation. These effects are already present during the first weeks of abstinence from methamphetamine and are linked to psychiatric symptoms assessed during this period. Copyright 2010, Springer.

Does cannabis use affect prospective memory in young adults?

Bartholomew J; Holroyd S; Heffernan TM. *Journal of Psychopharmacology* 24(2): 241-246, 2010. (39 refs.)
The aim of the present study was to examine prospective memory impairments associated with cannabis use in young adults. An independent measures design utilising pre-existing groups of users and non-users was employed in which an opportunity sample of 90 undergraduates studying at universities in the north east of England participated. The number of prospective memory failures reported on the Prospective Memory Questionnaire and the number of location-action combinations correctly recalled during a video-based prospective memory task were measured. The number of strategies used to assist memory, level of anxiety and depression, and use of alcohol, nicotine and any other recreational drugs in addition to cannabis were also measured and controlled during the analysis. Analysis revealed no significant differences in the number of self-reported prospective memory failures; however, cannabis users recalled significantly fewer location-action combinations than non-users in the video-based prospective memory task. The findings from the present study suggest that cannabis use has a detrimental effect on prospective memory ability in young adults but users may not be aware of these deficits. Copyright 2010, Sage Publications.

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Aims: Because the TAQ1 A1 allele may be associated with alcohol-related medical illnesses, and medical illnesses in alcohol-dependent individuals are associated with increased mortality, we test the hypothesis that the TAQ1 A1 allele of the DRD2 gene is associated with increased mortality in alcohol-dependent individuals. Methods: Following an index treatment episode, a 10-year follow-up study in 366 alcohol-dependent individuals was performed. The TAQ1 A1/A2 DRD2 genotype and allele frequencies were compared between those deceased and those still

living at the 10-year point. In addition, the genotype and allele frequencies of these alcohol-dependent individuals were compared to that in 578 control subjects. Results: The prevalence of the A1 allele differed between the deceased and living patients and the controls: 47% of the deceased were A1+, compared to 37% of the living patients and 32% of the controls. The frequency of the TAQ1 A1/A2 genotype also differed between the groups. Thus, 43% had the A1/A2 genotype in comparison with 32% in the living patients and 29% in the controls. The TAQ1 A1 allele frequency differed between the groups. The frequency of A1 allele was 25% in the deceased patients compared to 21% in the living patients and 17% in the controls. Conclusion: The TAQ1 A1 allele of the DRD2 gene (or DRD2 gene region) was associated with increased mortality over a 10-year period in alcohol-dependent individuals. Copyright 2010, Oxford University Press.

Alcohol use while on the liver transplant waiting list: A single-center experience.

Carbonneau M; Jensen LA; Bain VG; Kelly K; Meeberg G; Tandon P. *Liver Transplantation* 16(1): 91-97, 2010. (23 refs.)

Alcoholic liver disease (ALD) is a leading indication for liver transplantation. Our center has randomly checked blood alcohol levels (BALs) in ALD patients on the waiting list since 2004. We aimed to identify the incidence and predictors of inactivation on the transplant list due to alcohol use and to determine the utility of BAL-screening in this process. We conducted a retrospective review of patients with ALD listed for liver transplantation with at least 3 months of postlisting follow-up. Alcohol use while on the transplant list was defined as a positive BAL, an admission of alcohol use, or refusal to perform screening within 12 hours of request. Cox proportional hazards regression was used to estimate risk ratios (RRs). Of 134 patients meeting eligibility criteria, 78% were male, and mean age was 52 years. Alcohol use was documented in 23 patients (17%). Of these, 12 refused to have a random screen, 8 had detectable serum ethanol levels, and 3 had self-reported alcohol use. On multivariable analysis, a higher number of random BAL-checks [RR = 0.63(0.52, 0.76), P = 0.001] and a longer duration of prelisting abstinence [RR = 0.88(0.83, 0.94), P = 0.001] independently reduced the risk of alcohol use by patients while on the waiting list. None of the patients with > 24 months of prelisting abstinence had a positive screen. In conclusion, this study supports random BAL-screening before transplantation and reinforces the importance of abstinence duration as a predictor of relapse. For

patients with < 24 months of prelisting abstinence, our center will increase the frequency of random BAL screening and increase the rehabilitation requirements to include an intensive 3-week rehabilitation program. We hope that these measures will reduce the rate of relapse to alcohol use post-transplantation. Copyright 2010, John Wiley & Sons.

Maternal smoking during pregnancy and offspring obesity: Meta-analysis.

Ino T. *Pediatrics International* 52(1): 94-99, 2010. (49 refs.)

Background: Recent reports have suggested that maternal smoking may increase the risk of development of obesity in the unborn child in later life, but relatively few cohort studies have been done on the relationship between maternal smoking during pregnancy and future development of metabolic syndrome. Methods: A systematic review and meta-analysis of observational studies. Results: Seventeen papers were identified from 444 English-language papers (key word search: maternal smoking and obesity) in PubMed. All papers showed a positive association between maternal smoking during pregnancy and childhood obesity. The meta-analysis, using the DerSimonian-Laird method, found the association to be statistically significant. In association with maternal smoking during pregnancy and body mass index with more than 95%CI in the offspring aged 3-33 years, the pooled odds ratio calculated from 16 of these 17 studies was 1.64 (95%CI: 1.42-1.90). After adjustment for publication bias, the pooled adjusted odds ratio was 1.52 (95%CI: 1.36-1.70). In addition, confounders of maternal obesity, low social status, low birthweight and not being breast-fed seemed to be risk factors for offspring obesity. Conclusion: Maternal smoking during pregnancy may cause future obesity and metabolic syndrome. Copyright 2010, Wiley-Blackwell.

A vaccine against nicotine for smoking cessation: A randomized controlled trial.

Cornuz J; Zwahlen S; Jungi WF; Osterwalder J; Klingler K; van Melle G et al. *PLoS one* 3(6): e-2547, 2008. (24 refs.)

Background: Tobacco dependence is the leading cause of preventable death and disabilities worldwide and nicotine is the main substance responsible for the addiction to tobacco. A vaccine against nicotine was tested in a 6-month randomized, double blind phase II smoking cessation study in 341 smokers with a subsequent 6-month follow-up period. Methodology/Principal Findings: 229 subjects were randomized to receive five intramuscular injections of

the nicotine vaccine and 112 to receive placebo at monthly intervals. All subjects received individual behavioral smoking cessation counseling. The vaccine was safe, generally well tolerated and highly immunogenic, inducing a 100% antibody responder rate after the first injection. Point prevalence of abstinence at month 2 showed a statistically significant difference between subjects treated with Nicotine-Q beta (47.2%) and placebo (35.1%) ($P = 0.036$), but continuous abstinence between months 2 and 6 was not significantly different. However, in subgroup analysis of the per-protocol population, the third of subjects with highest antibody levels showed higher continuous abstinence from month 2 until month 6 (56.6%) than placebo treated participants (31.3%) (OR 2.9; $P = 0.004$) while medium and low antibody levels did not increase abstinence rates. After 12 month, the difference in continuous abstinence rate between subjects on placebo and those with high antibody response was maintained (difference 20.2%, $P = 0.012$). Conclusions: Whereas Nicotine-Q beta did not significantly increase continuous abstinence rates in the intention-to-treat population, subgroup analyses of the per-protocol population suggest that such a vaccination against nicotine can significantly increase continuous abstinence rates in smokers when sufficiently high antibody levels are achieved. Immunotherapy might open a new avenue to the treatment of nicotine addiction. Copyright 2008, Public Library of Science.

Waterpipe tobacco and cigarette smoking direct comparison of toxicant exposure.

Eissenberg T; Shihadeh A. *American Journal of Preventive Medicine* 37(6): 518-523, 2009. (34 refs.)

Background: Waterpipe (hookah, shisha) tobacco smoking has spread worldwide. Many waterpipe smokers believe that, relative to cigarettes, waterpipes are associated with lower smoke toxicant levels and fewer health risks. For physicians to address these beliefs credibly, waterpipe use and cigarette smoking must be compared directly. Purpose: The purpose of this study is to provide the first controlled, direct laboratory comparison of the toxicant exposure associated with waterpipe tobacco and cigarette smoking. Methods: Participants ($N=31$; $M=21.4$ years, $SD=2.3$) reporting monthly waterpipe use ($M=5.2$ uses/month, $SD=4.0$) and weekly cigarette smoking ($M=9.9$ cigarettes/day, $SD=6.4$) completed a crossover study in which they each smoked a waterpipe for a maximum of 45 minutes, or a single cigarette. Outcome measures included expired-air carbon monoxide (CO) 5 minutes after session's end, and blood carboxyhemoglobin (COHb), plasma nicotine,

heart rate, and puff topography. Data were collected in 2008-2009 and analyzed in 2009. Results: On average, CO increased by 23.9 ppm for waterpipe use (SD=19.8) and 2.7 ppm for cigarette smoking (SD=1.8), while peak waterpipe COHb levels (M=3.9%, SD=2.5) were three times those observed for cigarette smoking (M=1.3%, SD=0.5; $p < 0.001$). Peak nicotine levels did not differ (waterpipe M=10.2 ng/mL, SD=7.0; cigarette M=10.6 ng/mL, SD=7.7). Significant heart rate increases relative to pre-smoking were observed at 5, 10, 15, 20, 25, and 35 minutes during the cigarette session and at 5-minute intervals during the waterpipe session ($p < 0.001$). Mean total puff volume was 48.6 L for waterpipe use as compared to 1.0 L for cigarette smoking ($p < 0.001$). Conclusions: Relative to cigarette smoking, waterpipe use is associated with greater CO, similar nicotine, and dramatically more smoke exposure. Physicians should consider advising their patients that waterpipe tobacco smoking exposes them to some of the same toxicants as cigarette smoking and therefore the two tobacco-smoking methods likely share some of the same health risks. Copyright 2009, Elsevier Science.

Levamisole tainted cocaine causing severe neutropenia in Alberta and British Columbia.

Knowles L; Buxton JA; Skuridina N; Achebe I; LeGatt D; Fan SH et al. *Harm Reduction Journal* 6(30), 2009. (23 refs.)

Background: Five cases of severe neutropenia (neutrophil counts < 0.5 per 10^9 cells/L) associated with exposure to cocaine and levamisole, an antihelminthic agent no longer available in Canada, were identified in Alberta in 2008. Alberta and British Columbia (BC) public health officials issued an advisory and urged health care professionals to report cases to public health. This paper presents the findings of the public health investigations. Methods: Cases were identified prospectively through reporting by clinicians and a retrospective review of laboratory and medical examiners data from January 1, 2006 to March 31, 2009. Cases were categorized as confirmed, probable or suspect. Only the confirmed and probable cases are included in this paper. Results: We compare cases of severe neutropenia associated with tainted cocaine (NATC) identified in Alberta and BC between January 1, 2008 to March 31, 2009. Of the 42 NATC cases: 23(55%) were from Alberta; 19(45%) were from British Columbia; 57% of these cases reported crack cocaine use (93% of those who identified type of cocaine used); 7% reported using cocaine powder; and

the main route of cocaine administration was from smoking (72%). Fifty percent of the NATC cases had multiple episodes of neutropenia associated with cocaine use. Cases typically presented with bacterial/fungal infections and fever. One Alberta NATC case produced antineutrophil antibodies, and four were positive for anti-neutrophil cytoplasmic antibody (ANCA). Analysis of two crack pipes and one drug sample obtained from NATC cases confirmed the presence of both cocaine and levamisole. A further 18 cases were identified through the retrospective review of laboratory and medical examiner data in Alberta Interpretation: Our findings support a link between neutropenia and levamisole tainted cocaine; particularly from smoking the crack form of cocaine. Some patients may be genetically predisposed to develop levamisole-related neutropenia. Awareness of the differential diagnosis will assist clinicians with case timely detection and appropriate management. Copyright 2009, BioMed Central.

Injecting human growth hormone as a performance-enhancing drug: Perspectives from the United Kingdom. (review).

Evans-Brown M; McVeigh J. *Journal of Substance Use* 14(5): 267-288, 2009. (121 refs.)

Injectable human growth hormone has been used as a performance-enhancing drug in the United Kingdom since at least the mid-1980s. However, because of its prohibitive cost and limited supply it was initially restricted to a relatively small number of people. More recently data suggest that there has been a large increase in the use of the hormone within some sections of the general population. Here the hormone is usually taken as part of a high-dose polydrug regimen (which includes multiple types of anabolic steroids) predominately to enhance physique and/or bodily aesthetics. However, detailed systematic studies of the cultural diffusion of this drug (including the motivations for use, prevalence, patterns of use, and supply network) are lacking. Moreover, questions about growth hormone's efficacy, effectiveness, and safety (including risks from injecting and the use of adulterated products) when used as a performance-enhancing drug remain largely unanswered. This article reviews the data that are available on the self-directed use of growth hormone in the United Kingdom and the associated risks to individual and public health. Copyright 2009, Informa Healthcare.