Medical cannabis reports: sickle cell anemia, migraines, Alzheimer's, multiple sclerosis, overdose deaths, fractures, PTSD, traumatic brain injury, bipolar disorder, spinal cord injury, epilepsy, and others

1) Cannabinoids reduce inflammation pain in sickle anaemia

Researchers showed that cannabinoids ameliorate mast cell activation, inflammation and neurogenic inflammation in sickle mice via both cannabinoid receptors 1 and 2. Thus, cannabinoids influence systemic and neural mechanisms, ameliorating the disease pathobiology and pain in mice with sickle cell anaemia.

University of Minnesota, USA.

2) Science/Human: Patients with migraine may profit from cannabis according to an observational study

The frequency of migraine headache can be decreased by the medical use of cannabis according to research by scientists of the Department of Clinical Pharmacy of the University of Colorado in Aurora and other medical institutions of Colorado. They conducted a retrospective chart review of 121 adults with the primary diagnosis of migraine headache, who were recommended migraine treatment or prophylaxis with cannabis by a physician, between January 2010 and September 2014, and had at least one follow-up visit. Migraine headache frequency on average decreased from 10.4 to 4.6 headaches per month with the use of cannabis. Most patients used more than one form of cannabis and used it daily for prevention of migraine headache. Positive effects were reported in 48 patients (39.7%), with the most common effects reported being prevention of migraine headache with decreased frequency of migraine headache (24 patients [19.8%]) and aborted migraine headache (14 patients [11.6%]).


3) Science/Human: Cannabis oil may help in the treatment of symptoms of Alzheimer’s disease

Delusions, aggression, irritability and other symptoms may be reduced in patients with dementia by cannabis oil, researchers of the Abarbanel Mental Health Center in Bat-Yam, and Sackler Faculty of Medicine of Tel-Aviv University, Israel, wrote in the Journal of Alzheimer Disease. Eleven patients with Alzheimer's disease were recruited to an open label, 4 weeks, prospective trial. Ten patients completed the trial. Significant reduction in the score of Clinical Global Impression (6.5 to 5.7) and the Neuropsychiatric Inventory score were recorded (44.4 to 12.8). In the Neuropsychiatric Inventory scale the following aspects significantly decreased: Delusions, agitation/aggression, irritability, apathy, and sleep and caregiver distress. Authors concluded that adding cannabis
oil to Alzheimer disease patients’ “pharmacotherapy is safe and a promising treatment option.”


4) Science/Human: Cannabis reduced neuropathic pain in patients with multiple sclerosis in an open study

A treatment with the cannabis extract Sativex resulted in pain reduction of multiple sclerosis sufferers. This is a result of research at the IRCCS Centro Neurolesi "Bonino-Pulejo" in Messina, Italy. Scientists enrolled 20 MS patients (10 with and 10 without neuropathic pain) into the study, who underwent a specific clinical and neurophysiological assessment, before and after 4 weeks of Sativex administration. One month of drug administration in MS patients with neuropathic pain successfully reduced pain rating and improved quality of life. Interestingly, such effects were paralleled by certain changes in nerve cell communication. Authors concluded that their data suggest that “Sativex may be effective in improving MS-related neuropathic pain, maybe through its action on specific cortical pathways.”


5) Medical Cannabis Laws and Opioid Analgesic Overdose Mortality in the United States, 1999-2010

IMPORTANCE Opioid analgesic overdose mortality continues to rise in the United States, driven by increases in prescribing for chronic pain. Because chronic pain is a major indication for medical cannabis, laws that establish access to medical cannabis may change overdose mortality related to opioid analgesics in states that have enacted them.

OBJECTIVE: To determine the association between the presence of state medical cannabis laws and opioid analgesic overdose mortality.

DESIGN, SETTING, AND PARTICIPANTS: A time-series analysis was conducted of medical cannabis laws and state-level death certificate data in the United States from 1999 to 2010; all 50 states were included.

EXPOSURES: Presence of a law establishing a medical cannabis program in the state.

MAIN OUTCOMES AND MEASURES: Age-adjusted opioid analgesic overdose death rate per 100 000 population in each state. Regression models were developed including state and year fixed effects, the presence of 3 different policies regarding opioid analgesics, and the state-specific unemployment rate.

RESULTS: Three states (California, Oregon, and Washington) had medical cannabis laws effective prior to 1999. Ten states (Alaska, Colorado, Hawaii, Maine, Michigan,
Montana, Nevada, New Mexico, Rhode Island, and Vermont) enacted medical cannabis laws between 1999 and 2010. **States with medical cannabis laws had a 24.8% lower mean annual opioid overdose mortality rate (95%CI, −37.5% to −9.5%; P = .003) compared with states without medical cannabis laws.** Examination of the association between medical cannabis laws and opioid analgesic overdose mortality in each year after implementation of the law showed that such laws were associated with a lower rate of overdose mortality that generally strengthened over time: year 1 (−19.9%; 95%CI, −30.6% to −7.7%; P = .002), year 2 (−25.2%; 95%CI, −40.6% to −5.9%; P = .01), year 3 (−23.6%; 95%CI, −41.1% to −1.0%; P = .04), year 4 (−20.2%; 95%CI, −33.6% to −4.0%; P = .02), year 5 (−33.7%; 95%CI, −50.9% to −10.4%; P = .008), and year 6 (−33.3%; 95%CI, −44.7% to −19.6%; P < .001). In secondary analyses, the findings remained similar.

**CONCLUSIONS AND RELEVANCE** Medical cannabis laws are associated with significantly lower state-level opioid overdose mortality rates. Further investigation is required to determine how medical cannabis laws may interact with policies aimed at preventing opioid analgesic overdose.

Marcus A. Bachhuber, MD; Brendan Saloner, PhD; Chinazo O. Cunningham, MD, MS; Colleen L. Barry, PhD, MPP
Published online August 25, 2014.

6) **Cannabidiol, a Major Non-Psychotropic Cannabis Constituent Enhances Fracture Healing and Stimulates Lysyl Hydroxylase Activity in Osteoblasts**

**ABSTRACT**
Cannabinoid ligands regulate bone mass, but skeletal effects of cannabis (marijuana and hashish) have not been reported. Bone fractures are highly prevalent, involving prolonged immobilization and discomfort. **Here we report that the major non-psychoactive cannabis constituent, cannabidiol (CBD), enhances the biomechanical properties of healing rat mid-femoral fractures.** The maximal load and work-to-failure, but not the stiffness, of femurs from rats given a mixture of CBD and D9-tetrahydrocannabinol (THC) for 8 weeks were markedly increased by CBD. This effect is not shared by THC (the psychoactive component of cannabis), but THC potentiates the CBD stimulated work-to-failure at 6 weeks postfracture followed by attenuation of the CBD effect at 8 weeks. Using micro–computed tomography (mCT), the fracture callus size was transiently reduced by either CBD or THC 4 weeks after fracture but reached control level after 6 and 8 weeks. The callus material density was unaffected by CBD and/or THC. By contrast, CBD stimulated mRNA expression of Plod1 in primary osteoblast cultures, encoding an enzyme that catalyzes lysine hydroxylation, which is in turn involved in collagen crosslinking and stabilization. Using Fourier transform infrared (FTIR) spectroscopy we confirmed the increase in collagen crosslink ratio by CBD, which is likely to contribute to the improved biomechanical properties of the fracture callus. **Taken together, these data show that CBD leads to improvement in fracture healing and demonstrate the critical mechanical role of collagen crosslinking enzymes.**
7) **People with posttraumatic stress disorder have lower levels of endocannabinoids in their hair**

Research with 38 rebel war survivors from Uganda, who suffered from posttraumatic stress disorder (PTSD), and 38 rebel war survivors without PTSD showed that those with PTSD had lower levels of endocannabinoids in their hair. **Authors wrote that “the observed reductions in endocannabinoids might account for the increased inflammatory state as well as for the failure to extinguish fear memories observed in PTSD. Our findings add to the accumulating evidence suggesting the endocannabinoid system as a target for pharmacological enhancement of exposure-based psychotherapy for PTSD.”**

Institute of Psychology & Education, Ulm University, Germany.


8) **Cannabis users tend to drive more cautiously in a driving simulator**

Cannabis users were tested under the influence of alcohol and cannabis in a driving simulator. Authors wrote that "cannabis was associated with slower driving and greater headway, suggesting a possible awareness of impairment and attempt to compensate."

National Institute on Drug Abuse, Baltimore, USA.


9) **The endocannabinoid-CB₁ receptor system in pre- and postnatal life**

Recent research suggests that the endogenous cannabinoids (“endocannabinoids”) and their cannabinoid receptors have a major influence during pre- and postnatal development. **First, high levels of the endocannabinoid anandamide and cannabinoid receptors are present in the preimplantation embryo and in the uterus, while a temporary reduction of anandamide levels is essential for**
**embryonal implantation.** In women accordingly, an inverse association has been reported between fatty acid amide hydrolase (the anandamide degrading enzyme) in human lymphocytes and miscarriage. Second, CB₁ receptors display a transient presence in white matter areas of the pre- and postnatal nervous system, suggesting a role for CB₁ receptors in brain development. Third, endocannabinoids have been detected in maternal milk and activation of CB₁ receptors appears to be critical for milk sucking by newborn mice, apparently activating oral–motor musculature. Fourth, anandamide has neuroprotectant properties in the developing postnatal brain. Finally, prenatal exposure to the active constituent of marihuana (Δ⁹-tetrahydrocannabinol) or to anandamide affects prefrontal cortical functions, memory and motor and addictive behaviors, suggesting a role for the endocannabinoid CB₁ receptor system in the brain structures which control these functions. Further observations suggest that children may be less prone to psychoactive side effects of Δ⁹-tetrahydrocannabinol or endocannabinoids than adults. *The medical implications of these novel developments are far reaching and suggest a promising future for cannabinoids in pediatric medicine for conditions including “non-organic failure-to-thrive” and cystic fibrosis.*

European Journal of Pharmacology

10) **Several cannabinoids may be useful in the treatment of acne**

In experiments with sebocytes, cells that secrete sebum, some cannabinoids increased sebum production, while others decreased. Researchers wrote that their “data suggest that CBG and CBGV may have potential in the treatment of dry-skin syndrome, whereas CBC, CBDV and especially THCV show promise to become highly efficient, novel anti-acne agents.”

Department of Physiology, Faculty of Medicine, University of Debrecen, Hungary.

11) **THC had no effect on disease progression in monkey model of AIDS**

Rhesus macaques, which were infected with the SI virus, corresponding to the HIV of humans, were treated with 0.32 mg/kg body weight or placebo for 428 days. *Researchers noted that it is “unlikely” that THC has a negative effect on disease progression.*

Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China.
12) Cannabinoid agonist rescues learning and memory after a traumatic brain injury.

Traumatic brain injury can cause persistent challenges including problems with learning and memory. Previous studies suggest that the activation of the cannabinoid 1 receptor after a traumatic brain injury could be beneficial. We tested the hypothesis that posttraumatic brain injury administration of a cannabinoid 1 receptor agonist can rescue deficits in learning and memory. Young adult male rats were subjected to a moderately severe controlled cortical impact brain injury, with a subset given postinjury i.p. injections of a cannabinoid receptor agonist. Utilizing novel object recognition and the morris water task, we found that the brain-injured animals treated with the agonist showed a marked recovery.

Arain M\textsuperscript{1}, Khan M\textsuperscript{1}, Craig L\textsuperscript{2}, Nakanishi ST\textsuperscript{3}.

13) Cannabinoids: Well-Suited Candidates for the Treatment of Perinatal Brain Injury

Perinatal brain injury can be induced by a number of different damaging events occurring during or shortly after birth, including neonatal asphyxia, neonatal hypoxia-ischemia and stroke-induced focal ischemia. Typical manifestations of these conditions are the presence of glutamate excitotoxicity, neuroinflammation and oxidative stress, the combination of which can potentially result in apoptotic-necrotic cell death, generation of brain lesions and long-lasting functional impairment. In spite of the high incidence of perinatal brain injury, the number of clinical interventions available for the treatment of the affected newborn babies is extremely limited. Hence, there is a dramatic need to develop new effective therapies aimed to prevent acute brain damage and enhance the endogenous mechanisms of long-term brain repair. The endocannabinoid system is an endogenous neuromodulatory system involved in the control of multiple central and peripheral functions. An early responder to neuronal injury, the endocannabinoid system has been described as an endogenous neuroprotective system that once activated can prevent glutamate excitotoxicity, intracellular calcium accumulation, activation of cell death pathways, microglia activation, neurovascular reactivity and infiltration of circulating leukocytes across the blood-brain barrier. The modulation of the endocannabinoid system has proven to be an effective neuroprotective strategy to prevent and reduce neonatal brain injury in different animal models and species. Also, the beneficial role of the endocannabinoid system on the control of the endogenous repairing responses (neurogenesis and white matter restoration) to neonatal brain injury has been described in independent studies. This review addresses the particular effects of several drugs that modulate the activity of the endocannabinoid system on the progression of different manifestations of perinatal brain injury during both the acute and chronic recovery phases using rodent and non-rodent animal models, and will provide a complete description of the known mechanisms that mediate such effects.

David Fernández-López,\textsuperscript{1} Ignacio Lizasoain,\textsuperscript{2} María Ángeles Moro,\textsuperscript{2} and José Martínez-Orgado\textsuperscript{3}
14) **Cannabis showed beneficial effects in bipolar disorder in clinical study**

For some bipolar patients, cannabis may result in partial alleviation of clinical symptoms in bipolar disorders, scientists of McLean Hospital in Belmont, of Harvard Medical School in Boston and Tufts University in Medford, USA, said. Twelve patients with bipolar disorder who smoke cannabis, 18 bipolar patients who do not smoke, 23 healthy cannabis smokers and 21 healthy controls completed a neuropsychological battery. Further, they rated their mood three times daily as well as after each instance of cannabis use over a four-week period. Results revealed that although cannabis and bipolar disorder was associated with some degree of cognitive impairment, no significant differences between the two groups suffering from bipolar disorder were apparent, providing no evidence of an additive negative impact of bipolar disorder and cannabis use on cognition. **Additionally, patients with bipolar disorders, who used cannabis, experienced a substantial mood improvement.**


15) **Inhaled cannabis reduces neuropathic pain in patients with spinal cord injury**

Inhalation of cannabis by a vaporizer reduced pain in 42 patients, who suffered from neuropathic pain related to injury or disease of the spinal cord. This is the result of a placebo controlled study by researchers of the University of California, USA, published in The Journal of Pain. After obtaining baseline data, participants underwent a standardized procedure for inhaling 4 puffs of vaporized cannabis containing either placebo, 2.9%, or 6.7% THC on three separate occasions. A second dosing occurred 3 hours later; participants chose to inhale 4 to 8 puffs.

Using an 11-point numerical pain intensity rating scale, scientists demonstrated a significant analgesic response for vaporized cannabis. Psychoactive and subjective effects were dose dependent. The two active doses did not significantly differ from each other in terms of analgesic potency. Authors concluded that “**this study supports consideration of future research that would include longer duration studies over weeks to months in order to evaluate the efficacy of medicinal cannabis in patients with central neuropathic pain.**”

16) Science/USA: Elderly patients were prescribed fewer medicinal drugs if they had access to medical cannabis

Physicians wrote significantly fewer prescriptions for painkillers and other medications for elderly and disabled patients who had legal access to medical cannabis, a new study finds. **Medicare saved more than 165 million dollars in 2013 on prescription drugs in the District of Columbia and 17 states that allowed cannabis to be used as medicine, researchers calculated.** Medicare is a national social insurance program of the USA. If every state in the USA legalized medical cannabis, the study forecast that the federal program would save more than 468 million dollars a year on pharmaceuticals for disabled Americans and those 65 and older. No health insurance, including Medicare, will reimburse for the cost of cannabis. Although medical cannabis is legal today in 25 states and the District of Columbia, federal law continues to prohibit its prescription in all circumstances. The new study, published July 6 in Health Affairs, was the first to ask if there’s any evidence that medical cannabis is being used as medicine, senior author W. David Bradford told Reuters in a phone interview. The answer is yes, said Bradford, a health economist and a professor at the University of Georgia in Athens. “When states turned on medical marijuana laws, we did see a rather substantial turn away from FDA-approved medicine,” he said.

Bradford AC, Bradford WD. Medical Marijuana Laws Reduce Prescription Medication Use in Medicare Part D. Health Aff (Millwood) 2016;35(7):1230-1236

17) Science/Human: A CBD extract reduced frequency of seizures in a rare form of epilepsy

The British company GW Pharmaceuticals said its CBD extract Epidiolex met the main goal to reduce frequency of seizures in a placebo-controlled phase 3 clinical study. The company said the drug significantly reduced the monthly frequency of short-term seizures in people suffering from a rare form of epilepsy called Lennox-Gastaut syndrome (LGS). The trial randomized 171 patients into two arms, where Epidiolex 20mg/kg body weight per day (n=86) or placebo (n=85) was added to current medication.

“From a physician’s perspective, the positive outcome in this trial of Epidiolex in patients with Lennox-Gastaut syndrome is very exciting. Lennox-Gastaut syndrome begins in early childhood, is particularly difficult to treat, and the vast majority of patients do not obtain an adequate response from existing therapies,” stated Dr Linda Laux, Director of the Comprehensive Epilepsy Center at Ann & Robert H. Lurie Children’s Hospital of Chicago and an investigator in the trial. **These data show that Epidiolex has the potential to provide a robust and clinically meaningful reduction in seizures in this highly treatment-resistant population together with an acceptable safety and tolerability profile, which is consistent with my previous clinical experience with Epidiolex.**

Press release by GW Pharmaceuticals of 27 June 2016
18) **Science/Human: Problematic use of opioids is more common in pain patients than problematic cannabis use**

In a study with 888 pain patients, those who were treated with opioids showed problematic opioid use in 52.6% according to DSM-IV. **Among those, who were treated with cannabis prevalence of problematic use was 21.2%**.

Department of Psychology, Ariel University, Israel.

19) **Science/Cells: The inflammation induced by amyloid beta in Alzheimer’s disease is blocked by THC**

A study with human nerve cells shows that amyloid beta, which is highly present in Alzheimer’s disease, causes inflammation. **THC was shown to stimulate the removal of amyloid beta in the nerve cells, to block the inflammatory response, and to be neuroprotective**.

The Salk Institute for Biological Studies, La Jolla, USA.; Currais A, et al. Aging and Mechanisms of Disease 2016;2:16012

20) **Science/Human: Medical cannabis laws in the USA are associated with a decline of absence from work due to sickness**

Utilizing the Current Population Survey, a study identified that absences from work due to sickness declined following the legalization of medical cannabis in the 24 states with medical cannabis laws analyzed. The effect was stronger for full-time workers, and for middle-aged males, which is the group most likely to hold medical cannabis cards. Those full-time employees between the ages of 50 and 59 were 13 percent less likely to report absences due to illness following medical cannabis legalization. Those ages 40 to 49 were 11 percent less likely to do so, and those ages 30 to 39 were 16 percent less likely to report a medical-related absence. **"The results of this paper therefore suggest that medical marijuana legalization would decrease costs for employers as it has reduced self-reported absence from work due to illness/medical issues,”**

Dr. Darin F. Ullman, a professor in the Economics department of the University of Wisconsin in Milwaukee, USA, wrote.

Ulman, DF, Health Economics, 2016 July 15

21) **Science/Human: Aggression decreases after cannabis use according to clinical study**

Using a validated behavioral measure of aggression in response to provocation, subjective aggression significantly increased after alcohol use and decreased after cannabis use. The study at the University of Maastricht, The Netherlands, included heavy alcohol (n = 20) and regular cannabis users (n = 21), and controls (n = 20). Alcohol and cannabis users received single doses of alcohol and placebo or cannabis and placebo, respectively. They were subjected to certain tests, which allow measuring of aggression. Subjective aggression significantly increased following aggression exposure in all groups while being sober. **Alcohol use increased subjective**
aggression whereas cannabis decreased the subjective aggression following aggression exposure. Aggressive responses during the PSAP (point-subtraction aggression paradigm) increased following alcohol and decreased following cannabis relative to placebo. Authors concluded “that alcohol facilitates feelings of aggression whereas cannabis diminishes aggressive feelings in heavy alcohol and regular cannabis users, respectively.”


22) Science/Human: Cannabis use had no negative effects on the outcome of kidney transplantations

Recreational use of cannabis had no negative effects on the health of kidney recipients in a study with 1225 patients. Results were published by scientists at the Department of Surgery of the University of Maryland School of Medicine in Baltimore, USA, in the journal Clinical Transplantation. They retrospectively reviewed data of kidney recipients from 2008-2013. Cannabis use was defined by positive urine toxicology screen and/or self-reported recent use. Cannabis use was not associated with worse outcomes. Ninety-two percent of grafts functioned at one year. Among these, measures of kidney function were similar between cannabis users and non-users. Researchers concluded that “isolated recreational marijuana use is not associated with poorer patient or kidney allograft outcomes at one year.”


23) Science/Human: No association between THC blood concentration and impairment of drivers

In a study with nearly 5000 drivers suspected of driving under the influence of drugs there was no correlation of tests on psychomotor performance and THC blood concentrations. The Orange County Crime Lab, Santa Ana, USA. Declues K, et al. J Forensic Sci. 2016 Aug 1. [in press]

24) Science/Animal: Second-hand smoke of cannabis may impair function of the arteries

One minute of exposure to cannabis second-hand smoke substantially impaired endothelial function of arteries in a study with rats for at least 90 minutes, considerably longer than impairment by tobacco second-hand smoke. Cardiovascular Research Institute, University of California, San Francisco, USA. Wang X, et al. J Am Heart Assoc 2016;5(8).
25) Science/Cells: The activation of CB2 receptors improves efferocytosis and stability of atherosclerotic plaques

In a study with a certain form of white blood cells (macrophages) the activation of CB2 receptors improved efferocytosis by macrophages and authors concluded that this “might provide a novel mechanism on how CB2 activation reduces vulnerability and promotes stability of atherosclerotic plaques.” Efferocytosis is the process by which dying/dead cells are removed by cells such as macrophages. Renji Hospital, School of Medicine, Shanghai Jiaotong University, China. Jiang L, et al. Life Sci. 2016 Jul 26. [in press]

26) CBDA may reduce the aggressiveness of breast cancer

Scientists investigated the mechanisms, by which cannabidiolic acid (CBDA) may reduce the expression of COX-2 (cyclooxygenase-2) in a certain human breast cancer cell line. They previously had shown that CBDA inhibits migration and thereby metastasis of these cancer cells. Faculty of Pharmaceutical Sciences, Hiroshima International University, Japan. Takeda S, et al. J Nat Med. 2016 Aug 16. [in press]

27) The pain-reducing effects of THC may be stronger in men than in women

In a study with 21 healthy men and 21 women, who underwent a test of acute pain (by putting their hands into cold water), cannabis significantly reduce pain sensitivity in the male participants but not in women. In both groups cannabis caused increased psychological effects. New York State Psychiatric Institute and Department of Psychiatry, Columbia University Medical Center, New York, USA. Cooper ZD, et al. Drug Alcohol Depend. 2016 Aug 5. [in press]

28) The endocannabinoid system is involved in the regulation of blood pressure

Research suggests a cross talk between components of the renin angiotensin system, which plays a major role in the regulation of blood pressure and the endocannabinoid system in astrocytes of Spontaneously Hypertensive Rats. Scientists noted that “the consequence of such a crosstalk could be a potential reduced endocannabinoid tone in brainstem in states of hypertension.” Department of Pharmaceutical Sciences, College of Pharmacy, Nova Southeastern University, Fort Lauderdale, USA. Haspula D, et al. J Neurochem. 2016 Aug 16. [in press]
29) **Science/Human: THC may be useful in the treatment of children with spasticity**

In the majority of severely ill children the treatment with THC showed promising effects in treatment resistant spasticity. This is the result of observations by scientists of the University of Dusseldorf, Germany, published in the EUROpean Journal of Paediatric Neurology. Sixteen children, adolescents and young adults having complex neurological conditions with spasticity (aged 1.3-26.6 years) were treated with THC by a specialized pediatric palliative care team between 2010 and 2015 in a home-care setting. Drops of an oily THC solution (dronabinol) were administered. A promising therapeutic effect was seen, mostly due to abolishment or marked improvement of severe, treatment resistant spasticity (n = 12). In two cases the effect could not be determined, two patients did not benefit. The median duration of treatment was 181 days (range 23-1429 days). Dosages to obtain a therapeutic effect varied from 0.08 to 1.0 mg THC per kg body weight with a median of 0.33 mg per kg daily in patients with a documented therapeutic effect. When administered as an escalating dosage scheme, side effects were rare and only consisted in vomiting and restlessness (one patient each). **Authors concluded that “in the majority of pediatric palliative patients the treatment with dronabinol showed promising effects in treatment resistant spasticity.”**


30) **Science/Human: Cannabis may be useful in adults with epilepsy according to a survey**

The use of cannabis may improve seizure control in adult patients with epilepsy. Scientists of the Department of Clinical Neurological Sciences of Western University in London, Ontario, Canada, published a survey with 292 patients suffering from epileptic seizures, from psychogenic nonepileptic seizures (PNES), and with both epileptic and PNES. Their age ranged from 27 to 49 years, and 57.2% were women. Epilepsy was documented in 190, PNES in 64, and both types of seizures in 26. Overall, 166 (57%) had tried cannabis, and 36.2% used it over the past year. Improvement in seizures was perceived by 84% in those with epilepsy and 72.7% in those with PNES. In the 2 groups, stress was decreased in 84.9% and 88%, sleep improved in 77.3% and 88%, and memory/concentration was better in 32% and 28%, respectively. Antiepileptic drug side effects were decreased in 53.2% of cannabis users. **Authors wrote that “patients with uncontrolled epilepsy or nonepileptic events had a high rate of marijuana use with associated perceived improvements in seizure control, stress, sleep, and drug side effects.”**

31) Science/Human: THC was effective in symptoms after stroke in a case report
Brain lesions can be a rare cause of difficult to treat psychiatric symptoms. Scientists presented a case of a obsessive-compulsive syndrome after infarct of the thalamus, a certain brain region, which improved by treatment with THC.


32) Science/Human: Cannabis users are less obese
In a study using data of the National Longitudinal Survey of Adolescent Health (13,038 participants in wave III and 13,972 in wave IV) scientists demonstrated that female cannabis users had a lower body mass index (BMI) of about 3.1% compared to non-users, and male users had 2.7% lower BMI compared to controls.

33 Science/Human: Epidemiological study supports the theory that patients with depression self-medicate with cannabis
A study with nearly 10,000 people analyzed the association between cannabis use and depression. Authors summarized that “the results not only support the Self-Medication Model for marijuana use but also provide modest support for the Stress Model, that substance use is associated with depressive symptoms, especially for females.”

34) Science/Human: Continuation of cannabis use after onset of psychosis is associated with worse outcome
In a study with 256 patients with a first episode of psychosis, who were followed for two years, those who were regular cannabis users before onset of the disease, had the best disease development, if they stopped cannabis use. Those who continued use had a higher rate of relapse.

35) In states with laws on medical cannabis there is less opioid abuse
In an analysis of 68,394 drivers from 18 US states, who died within one hour after a traffic accident between 1999 and 2013, scientists found a reduction of opioid presence in blood in states after legalization of medical cannabis use. In drivers aged 21 to 40 years opioid presence was reduced by 50% (OR = 0.50; 95% CI = 0.37, 0.67). Authors concluded that medical cannabis laws “may reduce opioid use and overdose.”
36) Gliomas in children may be destroyed by endocannabinoids

Low-grade gliomas consist of a mixed group of brain tumours that correspond to the majority of tumours of the central nervous system in children. A new study suggests that they may spontaneously disappear, which may be caused by endocannabinoids. In these spontaneously disappearing tumours there were higher concentrations of CB1 receptors than usual.
Ann and Robert H. Lurie Children's Hospital, Hospital of Chicago, USA.

37) Heavy cannabis users may have lower bone density

In a study with 56 moderate and 144 heavy cannabis users heavy cannabis use was associated with low bone mineral density.
Western General Hospital, University of Edinburgh, UK.

38) Science/Human: Cannabidiol improves severe form of childhood epilepsy in controlled clinical trial

The manufacturer of the CBD extract Epidiolex, GW Pharmaceuticals, reported of positive results of the second placebo-controlled Phase 3 clinical trial of this preparation for the treatment of seizures associated with Lennox-Gastaut syndrome, a rare and severe form of childhood-onset epilepsy. The trial randomized 225 patients into three arms, where Epidiolex was added to the current treatment in a dose of 20mg/kg body weight per day (n=76) or in a dose of 10mg/kg/day (n=73). The other patients (n=76) received a placebo.

Patients taking Epidiolex in the higher dose achieved a median reduction in monthly drop seizures of 42 percent compared with a reduction of 17 percent in patients taking placebo, and patients taking Epidiolex in the lower dose achieved a median reduction in monthly drop seizures of 37 percent. “The positive outcome in this second trial of Epidiolex in patients with Lennox-Gastaut syndrome demonstrates the effectiveness of this product in this particularly difficult to treat, childhood-onset epilepsy,” stated Dr Orrin Devinsky of New York University Langone Medical Centers and principal investigator in the trial.
Press release by GW Pharmaceuticals of 26 September 2016.

39) Science/Animal: The endocannabinoid system may be a target for the treatment of autism

In a rat model of autism researchers observed changes of the CB1 receptor and reduced levels of the endocannabinoid anandamide. Authors concluded that “the endocannabinoid system may represent a therapeutic target for the core and associated symptoms displayed by autistic patients.”
University "Roma Tre", Italy.
40) **Science/Animal: Cannabinoids increase the effects of standard anti-epileptic drugs**
Cannabinoids, which activate the CB1 receptor (WIN 55,212-2, ACEA), **potentiated the anti-epileptic effects** of carbamazepine, diazepam, felbamate, gabapentin, phenobarbital, topiramate and valproate in a mouse model of epilepsy.
Science of Health Department, School of Medicine, University "Magna Graecia" of Catanzaro, Italy.

41) **Science/Human: Cannabis improves pain and movement in patients with Parkinson’s disease in open clinical study**

Cannabis use improved pain and movement in 20 patients with Parkinson’s disease according to an open study conducted by scientists Rabin Medical Center in Petach Tikva and the Sackler Faculty of Medicine at Tel Aviv University, Israel. Symptoms were assessed before and 30 minutes after cannabis inhalation and again after long-term use. Motor function was assessed with the Unified PD Rating scale (UPDRS) and pain with the Pain Rating Index (PRI) and a Visual Analogue Scale (VAS). There was a significant improvement from baseline to 30 min after cannabis consumption in mean motor scores (38.1 to 30.4), pain according PRI (27 to 9.7) and pain VAS score (6.4 to 3.6). Authors concluded that cannabis “improved motor scores and pain symptoms in PD patients.” They wrote that “peripheral and central pathways are probably modulated by cannabis.”


42) **Science/Human: Sativex is useful in everyday clinical practice for the treatment of multiple sclerosis**

In the MOVE-2-EU study 433 patients with multiple sclerosis mainly from Italy, who received Sativex, were followed for three months. After 3 months 281 still used the medication with a mean dose of six sprays per day. Spasticity, spasms, fatigue, pain, sleep quality and bladder dysfunction were significantly improved.
University of Lille, France.

43) **Science/Human: No effect of THC on pain in patients with abdominal pain in controlled clinical study**

In a study with 65 patients with chronic abdominal pain THC given as a tablet up to 3x 8mg daily or a placebo for 50-52 days there was no significant difference between THC and placebo in their effect on pain scores.
Radboud University Medical Center, Nijmegen, The Netherlands.