Cannabis: Potenzial und Risiko
Eine wissenschaftliche Bestandsaufnahme

Eva Hoch, Chris Maria Friemel, Miriam Schneider (Hrsg.)

Cannabis: Potenzial und Risiko

Eine wissenschaftliche Bestandsaufnahme

Mit 45 Abbildungen

Gefördert durch:

Bundesministerium
für Gesundheit

aufgrund eines Beschlusses
des Deutschen Bundestages

Herausgeber
Eva Hoch
Ludwig-Maximilians-Universität München
Klinikum der Universität München
Klinik für Psychiatrie und Psychotherapie
München, Germany

Chris Maria Friemel
Ludwig-Maximilians-Universität München
Klinikum der Universität München
Klinik für Psychiatrie und Psychotherapie
München, Germany

Miriam Schneider
Entwicklungspsychologie und Biologische Psychologie
Psychologisches Institut der Universität Heidelberg
Universität Heidelberg
Heidelberg, Germany

ISBN 978-3-662-57290-0 ISBN 978-3-662-57291-7 (eBook)
DOI 10.1007/978-3-662-57291-7

Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über http://dnb.d-nb.de abrufbar.

1. Auflage 2019

Umschlaggestaltung: deblik Berlin
© Fotonachweis Umschlag: © darren415 / stock.adobe.com

Springer
© Springer-Verlag GmbH Deutschland, ein Teil von Springer Nature 2019
Das Werk einschließlich aller seiner Teile ist urheberrechtlich geschützt. Jede Verwertung, die nicht ausdrücklich vom Urheberrechtsgesetz zugelassen ist, bedarf der vorherigen Zustimmung des Verlags. Das gilt insbesondere für Vervielfältigungen, Bearbeitungen, Übersetzungen, Mikroverfilmungen und die Einspeicherung und Verarbeitung in elektronischen Systemen.
Die Wiedergabe von Gebrauchsnamen, Handelsnamen, Warenbezeichnungen usw. in diesem Werk berechtigt auch ohne besondere Kennzeichnung nicht zu der Annahme, dass solche Namen im Sinne der Warenzeichen und Markenschutz-Gesetzgebung als frei zu betrachten wären und daher von jedermann benutzt werden dürften.
Der Verlag, die Autoren und die Herausgeber gehen davon aus, dass die Angaben und Informationen in diesem Werk zum Zeitpunkt der Veröffentlichung vollständig und korrekt sind. Weder der Verlag noch die Autoren oder die Herausgeber übernehmen, ausdrücklich oder implizit, Gewähr für den Inhalt des Werkes, etwaige Fehler oder Äußerungen.

Gedruckt auf säurefreiem und chlorfrei gebleichtem Papier

Springer-Verlag GmbH Deutschland, ein Teil von Springer Nature
Die eingetragene Gesellschaft ist „Springer-Verlag GmbH Berlin Heidelberg"

Geleitworte

Foreword

A major public policy experiment is underway in the Americas. Since 2012, 8 US states have legalised recreational cannabis use, Uruguay decided to do so in 2013 and the Canadian government announced that it would do so in 2018. It may take a decade or more for the effects of this policy on public health and societal well-being to become clear by which time it may be difficult to reverse the policy. Given these developments, there has been a heightened interest in evidence on the adverse health effects of recreational cannabis use. A leading group of European researchers with an impressive expertise in the health and psychological effects of cannabis has systematically summarised the findings from major reviews of the research literature on the adverse effects of nonmedical cannabis use. They have used transparent processes to identify relevant reviews, outlined the evidential standards they have used in evaluating these reviews and they have synthesized the evidence in ways that policy makers will find useful.

The review confirmed that there is consistent epidemiological and experimental evidence that cannabis use acutely impairs cognitive performance and psychomotor coordination in ways that modestly increase the risk of persons having a car crash if they drive while intoxicated.

The cognitive effects of daily cannabis use over months or years are less clear cut because there have been few longitudinal studies and very fewer studies have examined whether the cognitive effects in long term users are reversed after sustained abstinence. A dependence syndrome is an undoubted risk for anyone who uses cannabis regularly, especially if they do so daily. The risk increases if users initiate in adolescence. Dependence is an underappreciated risk of cannabis use that is sometimes dismissed as an artefact of cannabis prohibition in that users only seek treatment to avoid criminal sanctions. This claim is implausible in view of the high rates of treatment seeking for cannabis use problems in the Netherlands which de facto legalised personal use in the 1970s. Cannabis dependence is the pattern of use most often associated with poor mental health, other substance use disorders, and poorer psychosocial outcomes.

The review provides a nuanced analysis of the evidence on whether cannabis use increases the risk of psychosis. It notes that there is a doubling or trebling of risk in daily cannabis users and that this risk is most often expressed in persons with a pre-existing vulnerability e. g. personal or family history of psychotic symptoms. The role of personal history is important risk information for persons with a first degree relative who has a psychosis. Early initiation of cannabis use in adolescence and regular use through adolescence is strongly correlated with poorer educational outcomes, such as early school leaving. This is probably the most socially important psychosocial outcome of cannabis dependence, given the effects that poor educational outcomes have on young adults' life chances. The complication in interpreting the evidence is that the young people who are most likely to initiate use early and become regular cannabis users are at higher risk of educational under-achievement before they use cannabis, because of school difficulties in primary school, childhood conduct disorder or social disadvantage. But there is little doubt that when these young people become regular cannabis users it makes their often poor outlook much worse and increases their risks of persistent social disadvantage in adulthood.

Regular cannabis use in adolescence and young adulthood is also associated with an increased risk of common mental disorders such as anxiety and depression. As the review

notes, there is more uncertainty about whether cannabis plays a causal role in the onset and persistence of these disorders. The risk of these disorders is modestly increased and persons with symptoms of these disorders in adolescence are more likely to use cannabis and alcohol and to develop problematic patterns of use of both drugs. It seems likely that adding a cannabis use disorder to an anxiety or depressive disorder will worsen the outlook for either disorder.

The possible long term adverse health effects of regular cannabis use throughout adulthood are still poorly understood. Under prohibition very few cannabis users engage in daily cannabis use over decades; it has been much more common for them to desist from using cannabis in their mid to late 20s. There are reasons to suspect, given similarities between the constituents of cannabis and tobacco smoke, that daily cannabis smoking over decades may increase the risks of respiratory disease, respiratory cancers and cardiovascular disease. So far the evidence most consistently shows an elevated risk of chronic bronchitis. The findings on COPD and respiratory cancers have been mixed and their interpretation complicated by the fact that most regular cannabis smokers are or have been daily cigarette smokers. An increased cardiovascular risk from cannabis smoking is looking more probable. This is of potentially greater concern given increased cannabis use among older adults for both medical and nonmedical reasons in the USA.

The review's findings are broadly congruent with two other similar reviews completed in the past two years by the World Health Organisation (2016) and the United States National Academy of Science (2017). The agreement in their findings is reassuring and enhances the credibility of all the reviews in light of the incompleteness and ambiguity of the available evidence. Critics of cannabis prohibition have with some justice argued that in the past equivocal evidence that recreational cannabis use can harm users has been over-interpreted. The repeal of prohibition raises a different set of interpretative risks: over-estimating the medical benefits of cannabis to hasten the legalisation of recreational use; and under-estimating the risks of daily cannabis use, especially when it is initiated in adolescence and continued throughout young adulthood. There is a reasonable concern that the prevalence of daily use will increase after legalisation as will the typical duration of cannabis use. Additional concerns are raised by the proliferation of high potency cannabis extracts in US states that have legalised cannabis. More potent cannabis products are likely to increase the risks of dependence and the adverse effects of cannabis use on the cognitive performance and mental health of young users.

I hope that we can avoid replicating the amnesia about the adverse health effects of alcohol that occurred after the repeal of national alcohol prohibition in the USA when all evidence of harm was dismissed as temperance propaganda. The effective communication to the community of the findings of credible reviews of the scientific literature like that of Eva Hoch and colleagues provides the best prospects of avoiding this undesirable public health outcome.

Wayne Hall
Centre for Youth Substance Abuse Research,
University of Queensland
National Addiction Centre,
Kings College London

Foreword

In this 21st century health care must be delivered by adherence to the highest ethical standards and be informed by sound scientific evidence. Health care professionals must practice medicine in a competent and empathetic manner, respecting patients' needs and beliefs in a spirit of shared-decision making, and must conform to the foundation principle of "first do no harm".

Cannabinoids and medical cannabis in particular have emerged as possible treatments for many illnesses that have to date presented treatment challenges. The human endocannabinoid system functions to maintain homeostasis by counterbalancing the "fight and fly" mechanism. With function to promote calm, sleep and appetite and also reduce pain and inflammation, harnessing these effects with an administered product seems ideal. Although laboratory studies of the effects of cannabinoids has been extensive and promising regarding health and disease, preclinical studies cannot immediately be translated into an expected effect in humans. It is only in recent years that the clinical evidence for effect of cannabis as a therapy has been explored.

Clinicians seek to heal disease and relieve suffering, but for many conditions the current therapeutic toolbox is limited. This is especially true for chronic pain due to a multitude of diseases, various neurological diseases and mental health disorders. It can therefore be understood that patients seek treatment options that may be outside the traditional treatment paradigm. Propelled by reports of thousands of years of medicinal use, the enthusiasm of the media, personal testimonies, as well as an immense corporate financial interest, cannabis has been accepted almost uncritically by the public as well as various jurisdictions worldwide, as a therapeutic option for many conditions. However, the scientific evidence for effect requires careful scrutiny.

This comprehensive review has undertaken this task. The authors have compiled an outstanding document by critically evaluating the published literature that addresses the questions of potential benefits and risks for medical cannabis by use of sound methodology. This overview of systematic reviews will be a foundation for continued work and scientific discussion of cannabis use for medical purposes in the future. Clinical research regarding cannabis has been hampered in the past due to the mostly illegal status of this substance in many countries, and therefore the evidence for both the positive and negative effects in the care of patients is scanty. At this time, the conclusions of this review must be used to guide both clinical practice and the decisions of regulatory authorities.

Examination of the positive effects of cannabis is disappointing. With some report of cannabinoids, but not the herbal preparation, improving nausea and vomiting associated with chemotherapy, there is less evidence for effect in other conditions. Cannabinoids may slightly improve appetite in persons with cancer, and increase weight in those with HIV/AIDS, but at the expense of frequent immediate unpleasant side effects. For all other conditions, including chronic pain, spasticity and mental disorders, the evidence for any substantial effect is lacking. Oftentimes, patients report subjective improvement in symptoms that may not be easily measurable, or may not reach statistical or clinical significance. This was observed for conditions such as spasticity in multiple sclerosis and pain reduction in chronic pain conditions. For all studies, cannabis treatments commonly cause side effects, which are seldom serious, but are often sufficiently severe to warrant discontinuation of treatment. The immediate side effects relate to impairment in cognitive abilities, psychomotor control, especially when driving a vehicle, and acute effects on mental health, including risk of anxiety, exacerbations of manic symptoms, and development of psychosis,

amongst others. The long term risks, especially for therapeutic use by patients, are less clear, but reflecting on information obtained from persons using cannabis recreationally, there is evidence for global effect on memory, development of cannabis dependence and substance abuse disorder, more mental health disease and poorer lifetime educational attainment.

In summary, the studies of the therapeutic effects of cannabis for patients fall short of the threshold for solid science for a number of reasons: studies are mostly of short duration, with some even a few days, whereas the need to treat the conditions proposed are mostly lifelong; there have been various methods of administration; various molecular contents; often heterogeneous diseases within a specific study, and inconsistent outcome measures. Importantly, the risks related to cannabis use have mostly been reported for recreational users, who are younger and in better health than patients with chronic illnesses. Furthermore, there remain many questions regarding the therapeutic and societal effects of cannabis including: for which diseases do we truly have no treatment, what will be the effect of interaction with other drugs, what about particular patient populations such as the elderly, young people or those with long standing chronic disease, and finally the overall societal consequences of use of products with psychoactive effects.

Even although the plant Cannabis sativa has been used as a medicinal agent for thousands of years, naive acceptance of anecdote and personal testimony, in the absence of clear scientific evidence, cannot be accepted to justify use in this age. Cannabis is not a panacea for all ills. The importance of evidence-based medicine is at the crux of competent medical practice and has been highlighted in recent decades. Based on the evidence assembled in this review it behoves the medical community to move forward rapidly to study the potential of medicinal cannabis according to current rigorous scientific standards.

Mary-Ann Fitzcharles MB,ChB,
Rheumatologist and Pain Medicine Physician
McGill University

Foreword

Cannabis is a generic term used for drugs produced from plants and tinctures belonging to the genus Cannabis and it is the most widely used recreational substance in Western countries including Europe, North America and Australia. Recreational long-term or heavy use of cannabis has been associated with the development of dependence, chronic bronchitis, and increased risk of chronic psychosis disorders in persons with a predisposition for development of such disorders. The acute effects of short-term cannabis are more controversial and may include impaired memory, impaired motor coordination with an associated increased risk of involvement in motor vehicle accidents, altered judgment and, in high doses, paranoia and psychosis.

Medical cannabis refers to the use of cannabis or cannabinoids as medical therapy to treat disease or alleviate symptoms. Canada and the Netherlands have government-run programs in which specialized companies supply quality-controlled herbal cannabis. In the United States, 23 states and Washington, DC (May 2015), have introduced laws to permit the medical use of cannabis. Within the European Union, medicinal cannabis laws and praxis vary wildly between countries. Recently there is a lot of discussion about the possible benefits of cannabis for therapeutic use, and as always, it is either favoured or opposed by ideological positions rather than by scientific evidence relating to the balance between benefits and risks of taking cannabinoids for therapeutic use. Therefore, it is important to summarize the available evidence to assess in an objective and transparent way the overall risks and possible benefits of taking cannabinoids.

This document provides an evaluation of the benefits and harms of cannabis use in adults by collecting, analysing and critically appraising all relevant studies on this topic. It represents a useful tool for evidence-based decision making and may be particularly helpful to detect signals of unknown adverse effects. Regulatory authorities and organizations with a role of providing guidance on health matters, have an obvious need of aggregated evidence as a basis for making regulatory decisions or for issuing treatment recommendations. This need is particularly compelling in areas with uncertainties in terms of beneficial or harmful effects of competitive treatments, or in terms of economic consequences for the health care systems. In these areas, the promotion of a document like this that summarizes the available evidence, may result in new knowledge to inform regulatory decisions. While individual studies were not able to detect a signal, the pooling process allowed to reach the statistical power required to highlight a difference on the outcomes of interest and particularly for adverse events. The need for more effective and transparent ways to produce better and more relevant research results aimed at improving patients', consumers', policy makers', researchers' and ultimately citizens', decision making has been the key message of the Evidence-Based Movement (EBM) over the last few decades. It is widely accepted that research is a crucial investment to improve patients care, foster innovation, knowledge advancement and social and economic development. Synthesising research should bring better future research by identifying where relevant questions have not been properly addressed, how most common methodological pitfalls occur, and how wastes that take places at different stages of the research process can be avoided. The production of reliable, relevant and accessible evidence seems to be the scope of this work. Nevertheless, the extent to which a review can draw conclusions about the effects of an intervention depends on whether the data and results from the included studies are valid. The quality of the evidence reflects the estimated likelihood that future research could change the direction or magnitude of the estimated intervention effect for a speci-

fic outcome and the population in question. So, an added value of this work has been to highlight that that there is insufficient knowledge to determine definitively the level of risk associated with cannabis use and that there is a need of effective action by research bodies to meet the evidence gap and improve the strength of the evidence underpinning recommendations and guidance on this topic.

Laura Amato
Department of Epidemiology Lazio Region- ASL Rome1
Co-ordinating Editor Cochrane Drugs and Alcohol Group

Vorwort

Keine Droge führt derzeit zu so intensiven, teilweise leidenschaftlich geführten Diskussionen wie Cannabis. Wie riskant ist der Gebrauch von Cannabis zu Rauschzwecken? Welches Potenzial birgt Cannabis, wenn es als Arznei genutzt wird? Wie sollte gesellschatlich mit der Substanz umgegangen werden?

Die Cannabisforschung ist eine noch junge Disziplin. Erst Anfang der 1990-er Jahre wurde das sogenannte endocannabinoide System als Teil des menschlichen Nervensystems entdeckt. Dies verbesserte unser Verständnis über die Wirkung der Cannabinoide, der Inhaltsstoffe der Hanfpflanze Cannabis sativa. Das körpereigene Cannabissystem ist in seiner Komplexität jedoch längst noch nicht vollständig erforscht – geschweige denn verstanden. Immer mehr und schneller werden wissenschaftliche Informationen zum Thema Cannabis verfügbar. Das macht die Datenlage für Experten wie Laien schwer überschaubar.

Um den internationalen wissenschaftlichen Kenntnisstand zum Potenzial und den Risiken von Cannabinoiden der letzten 10 Jahre zusammenzufassen und zu bewerten, hat das Bundesministerium für Gesundheit diese nun vorgelegte Expertise in Auftrag gegeben. Über 18 Monate lang haben wir eine „State-of-the-Art"-Literaturrecherche in fünf internationalen Datenbanken durchgeführt. Unser Anliegen war es, dabei systematisch, transparent, nachvollziehbar und an den höchsten methodischen Standards orientiert vorzugehen.

Erfreulicherweise unterstützen 30 nationale und internationale Wissenschaftlerinnen und Wissenschaftler dieses „Mammutprojekt". Als Autoren oder methodische Berater stellten sie ihre Fachkenntnis ehrenamtlich zur Verfügung. Unser aller Bestreben war es, aus der Fülle der vorliegenden Studien inhaltlich angemessene, objektive Aussagen abzuleiten. Wissenschaftliche Kriterien wurden hierbei zugrunde gelegt, potenzielle Interessenkonflikte vor Studienbeginn erfasst und ausgeschlossen.

Die neue Cannabisexpertise liefert Erkenntnisse über unterschiedlich ausgeprägte Effekte von Cannabinioden. Die aufgedeckten Risiken des Cannabiskonsums zum Freizeitgebrauch können künftig für eine gezieltere Prävention, Früherkennung und Behandlung genutzt werden. Im Bereich der medizinischen Anwendung von Cannabis kann die dargelegte Evidenz der Entwicklung von Behandlungsempfehlungen dienen. An Stellen, wo sich Inkonsistenzen oder Wissenslücken zeigen, wurden auch Desiderate für Forschungsvorhaben ausgesprochen. Kein Bestandteil der Expertise war die juristische Bewertung der Substanz Cannabis. Möglicherweise können die evidenzbasierten Ergebnisse jedoch dazu beitragen, die gesellschaftliche Diskussion zu versachlichen.

Dieses Projekt ist mit großem Engagement, Zeitaufwand und Herzblut der Beteiligten entstanden. Ihnen sei an dieser Stelle sehr herzlich dafür gedankt! Besonders hervorgehoben werden sollen Angelika Heimann und Ingrid Weber (beide Zentralinstitut für Seelische Gesundheit, Mannheim) und die Lektorin Michaela Mallwitz für ihre hochprofessionelle Unterstützung bei der Erstellung dieses Buches. Mögen viele Menschen von ihm profitieren!

Eva Hoch – für die Projektgruppe
München im Mai 2018

Inhaltsverzeichnis

Mitarbeiterverzeichnis

Autorinnen und Autoren

Adorjan, Kristina, Dr.
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Klinikum der Universität München
Campus Innenstadt
Nußbaumstraße 7
80336 München
Deutschland
Kristina.Adorjan@med.uni-muenchen.de

Bonnet, Udo, Prof. Dr.
Klinik für Psychiatrie, Psychotherapie und Psychosomatik
Evangelisches Krankenhaus Castrop-Rauxel
Akademisches Lehrkrankenhaus der Universität Duisburg-Essen
Grutholzallee 21
44577 Castrop-Rauxel
Deutschland
u.bonnet@evk-castrop-rauxel.de

Falkai, Peter, Prof. Dr.
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Klinikum der Universität München
Campus Innenstadt
Nußbaumstraße 7
80336 München
Deutschland
Peter.Falkai@med.uni-muenchen.de

Friemel, Chris Maria, Dr.
Forschungsgruppe Cannabinoide
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Klinikum der Universität München
Campus Innenstadt
Nußbaumstraße 7
80336 München
Deutschland
chris.friemel@med.uni-muenchen.de

Hasan, Alkomiet, Priv.-Doz. Dr.
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Klinikum der Universität München
Campus Innenstadt
Nußbaumstraße 7
80336 München
Deutschland
Alkomiet.Hasan@med.uni-muenchen.de

Häuser, Winfried, Prof. Dr.
Klinik für Innere Medizin 1 (Gastroenterologie, Hepatologie, Onkologie, Stoffwechsel- und Infektionskrankheiten, Psychosomatik)
Klinikum Saarbrücken gGmbH
Winterberg 1
66119 Saarbrücken
Deutschland
whaeuser@klinikum-saarbruecken.de

Hermann, Derik, Prof. Dr.
Klinik für Abhängiges Verhalten und Suchtmedizin
Zentralinstitut für Seelische Gesundheit
J 5
68159 Mannheim
Deutschland
Derik.Hermann@zi-mannheim.de

Hinz, Burkhard, Prof. Dr.
Institut für Pharmakologie und Toxikologie
Universität Rostock
Schillingallee 70
18057 Rostock
Deutschland
Burkhard.Hinz@med.uni-rostock.de

Hoch, Eva, Priv.-Doz. Dr.
Forschungsgruppe Cannabinoide
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Klinikum der Universität München
Campus Innenstadt
Nußbaumstraße 7
80336 München
Deutschland
eva.hoch@med.uni-muenchen.de

Höfler, Michael, Dr.
Institut für Klinische Psychologie und Psychotherapie
Technische Universität Dresden
Chemnitzer Straße 46a
01187 Dresden
Deutschland
michael.hoefler@tu-dresden.de

Jakob, Luise
Forschungsgruppe Cannabinoide
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Klinikum der Universität München
Campus Innenstadt
Nußbaumstraße 7
80336 München
Deutschland
Luise.Jakob@med.uni-muenchen.de

Kabisch, Johannes, B.SC.
Forschungsgruppe Cannabinoide
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Klinikum der Universität München
Campus Innenstadt
Nußbaumstraße 7
80336 München
Deutschland
Johannes.Kabisch@gmx.de

Kambeitz, Joseph, Dr.
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Klinikum der Universität München
Campus Innenstadt
Nußbaumstraße 7
80336 München
Deutschland
Joseph.Kambeitz@med.uni-muenchen.de

Koethe, Dagmar, Prof. Dr.
Brain and Mind Centre
The university of Sydney
94 Mallett Street
Camperdown
NSW 2050
Australia
dagmar.koethe@sydney.edu.au

Kraus, Ludwig, Prof. Dr.
IFT Institut für Therapieforschung
Leopoldstraße 175
80804 München
Deutschland
Kraus@ift.de

Lewecke, F. Markus, Prof. Dr.
Brain and Mind Centre
The university of Sydney
94 Mallett Street
Camperdown
NSW 2050
Australia
markus.leweke@sydney.edu.au

Lutz, Beat, Prof. Dr.
Institut für Physiologische Chemie
und Deutsches Resilienz Zentrum
Universitätsmedizin der Johannes Gutenberg-Universität Mainz
Duesbergweg 6
55128 Mainz
Deutschland
blutz@uni-mainz.de

Niemann, Dominik
Forschungsgruppe Cannabinoide
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Klinikum der Universität München
Campus Innenstadt
Nußbaumstraße 7
80336 München
Deutschland
dominik.niemann@gmx.de

Paul, Liane, Dr.
Institut für Rechtsmedizin
Ludwig-Maximilians-Universität München
Forensische Toxikologie
Nußbaumstraße 26
80336 Müchen
Deutschland
Liane.Paul@med.uni-muenchen.de

Petzke, Frank, Prof. Dr.
Universitätsmedizin Göttingen
Schmerz-Tagesklinik und -Ambulanz, Zentrum Anästhesiologie, Rettungs- und Intensivmedizin
Robert-Koch-Str. 40
37075 Göttingen
Deutschland
frank.petzke@med.uni-goettingen.de

Pfeiffer-Gerschel, Tim, Dr.
IFT Institut für Therapieforschung
Leopoldstraße 175
80804 München
Deutschland
Pfeiffer-Gerschel@ift.de

Pogarell, Oliver, Prof. Dr.
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Klinikum der Universität München
Campus Innenstadt
Nußbaumstraße 7
80336 München
Deutschland
Oliver.Pogarell@med.uni-muenchen.de

Preuss, Ulrich, Prof. Dr.
Klinik für Psychiatrie und Psychotherapie
VITOS-Klinik
Austraße 40
35745 Herborn
Deutschland
Ulrich.Preuss@vitos-herborn.de

Radbruch, Lukas, Prof. Dr.
Universitätsklinikum Bonn
Klinik für Palliativmedizin
Sigmund-Freud-Str. 25
53127 Bonn
Deutschland
lukas.radbruch@ukbonn.de

Sarubin, Nina, Prof. Dr.
Hochschule Fresenius
Infanteriestraße 11a
80797 München
Deutschland
nina.sarubin@hs-fresenius.de

Schacherbauer, Kathrin
Forschungsgruppe Cannabinoide
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Klinikum der Universität München
Campus Innenstadt
Nußbaumstraße 7
80336 München
Deutschland
kathrin.schacherbauer@gmx.de

Schäfer, Michael, Prof. Dr.
Klinik für Anästhesiologie mit Schwerpunkt op. Intensivmedizin
Charité – Universitätsmedizin Berlin
Campus Virchow Klinikum
Augustenburgerplatz 1
13353 Berlin
Deutschland
micha.schaefer@charite.de

Schmieder, Sophia
Forschungsgruppe Cannabinoide
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Klinikum der Universität München
Campus
Innenstadt
Nußbaumstraße 7
80336 München
Deutschland
sophiaschmieder@yahoo.com

Schneider, Miriam, Priv.-Doz. Dr.
Entwicklungspsychologie und Biologische Psychologie
Psychologisches Institut der Universität Heidelberg
Universität Heidelberg
Hauptstraße 47–51
69115 Heidelberg
Deutschland
miriam.schneider@mailbox.org

Simon, Roland
IFT Institut für Therapieforschung
Leopoldstraße 175
80804 München
Deutschland
RolandRSimon@t-online.de

Storr, Martin, Prof. Dr.
Gesundheitszentrum
Medizinisches Versorgungszentrum
Gauting-Starnberg
Bahnhofstraße 30
82131 Gauting
Deutschland
GIDoc@gmx.de

von Keller, Rupert, Dr.
Forschungsgruppe Cannabinoide
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Klinikum der Universität München
Campus Innenstadt
Nußbaumstraße 7
80336 München
Deutschland
rupert.vonkeller@gmail.com

Wissenschaftliche und methodische Beratung

Alferink, Judith, Priv.-Doz. Dr.
Universitätsklinikum Münster
Klinik und Poliklinik für Psychiatrie und Psychotherapie
Albert-Schweitzer-campus 1 Gebäude A9
48149 Münster
judith.alferink@ukmuenster.de

Copeland, Jan, Prof. Dr.
Cannabis Information and Support (CIS)
21 Cassandra Ave
PO Box 257
Australien
profj@ciscopeland.com

Ferri, Marica, Dr.
Head of Sector – Best Practices, Knowledge Exchange And Economic Issues Consequences, Responses And Best Practices Unit
European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)
Praça Europa 1, 1249–289
Lissabon
Portugal
marica.ferri@emcdda.europa.eu

Fowler, Christopher, Professor
Department of Pharmacology and Clinical Neuroscience
Umeå University
Building 2B
University Hospital
SE-90187 Umeå
Sweden
cf@pharm.umu.se

Abkürzungen

2-AG	2-Arachidonylglycerol
5-HA-Rezeptor	Hydroxytryptaminrezeptor
95% KI	95%-Konfidenzintervall
ABACADAE-Design	A: „Konsumieren wie gewöhnlich"-Bedingungen; B–E: Cannabis-Abstinenz-bedingungen
ABDH 6	alpha/beta-Hydrolase domain containing 6
ACC	anteriorer cingulärer Kortex
ADHS	Aufmerksamkeits-Defizit-Hyperaktivitäts-Syndrom
AEA	Anandamid (Arachidonsäure-derivat)
Aids	"acquired immune deficiency syndrome" (erworbenes Immundefizienzsyndrom)
ANOVA	Analysis of Variance
aOR	„adjusted" Odds Ratio
AWMF	Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften
BMG	Bundesministerium für Gesundheit (BMG)
BMI	Body-Mass-Index
cAMP	"cyclic adenosine phosphate" (zyklisches Adenosinmono-phosphat)
CANTAB	Cambridge Neuropsychological Test Automated Battery
CB1/CB 2	Cannabis-1-Rezeptor, Cannbis-2-Rezeptor
CBC	Cannabichromen
CBD	Cannabidiol
CBDV	Cannabidivarin
CBG	Cannabigerol
CBN	Cannabinol
CBV	Cannabivarin
CCT	Critical Tracking Task
CERQual	Confidence in the Evidence from Reviews of Qualitative research
CHDS	Christchurch Health and Development Study
CINV	chemotherapieinduzierte Nausea und Emesis
CNR 1	Cannabis-1-Rezeptor
COMPACT	Computerized Attention and Concentration Tests
COX	Cyclooxygenase
CPT	Continuous Performance Test
CREB	cAMP response element-binding protein
CRPS	"complex regional pain syndrome" (komplexes regionales Schmerzsyndrom)
CTT	Critical Tracking Task
CVLT	California Verbal Learning Test
d	Cohen's d (Maß der Effektstärke)
DAT	Divided Attention Test
DBD	diastolischer Blutdruck
df	"degrees of freedom" (Freiheitsgrade)
DLPFC	dorsolateraler präfrontaler CKortex
DMARD	"disease-modifying anti-rheumatic drug"
DRUID Project	Driving Under the Influence of Drugs, Alcohol and Medicines
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders
EAE	Autoimmun-Enzephalomyelitis
eCB-System	endogenes Cannabinoidsystem
ed	„embryonic day" (Tag der Embryonalentwicklung)
ESPAD	European School Survey Project on Alcohol and other Drugs
FAAH	Fatty-Acid-Amide-Hydrolase (Fettsäureamid-Hydrolase)
FEV_1	Exspirationssekundenvolumen
fMRT	funktionelle Magnetresonanz-tomographie
GABA	Gamma-Aminobuttersäure, γ-Aminobuttersäure
GHB	Gamma-Hydroxibuttersäure
GnRH	"Gonadotropin-„releasing" hormone"
GPR55	Orphan"-G-Protein-gekoppelter Rezeptor
GRADE	Grading of Recommendations Assessment, Development and Evaluation
HF	Herzfrequenz

HIV	„human immunodeficiency virus“
HPA-Achse	Hypothalamus-Hypophysen-Nebennierenrinden-Achse
HPG	Hypothalamus-Hypophysen-Gonaden
ICD-10	International Classification of Diseases and Related Health Problems
IMMPACT	Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials
IOP	intraokulärer Druck
IQ	Intelligenzquotient
I-QOL	Incontinence-Quality of Life (Inkontinenz Lebensqualität)
KI	Konfidenzintervall
LBW	„low birth weight“
LMU	Ludwig-Maximilians-Universität München
LoE	Level of Evidence
MA	Metaanalyse
MAGL	Monoazylglyzerol-Lipase
MAP-Kinase	“mitogen-activated“ Proteinkinase
MDK	Medizinischer Dienst der Krankenkassen
MDMA	3,4-Methylendioxy-N-methylamphetamin (MDMA)
MDMB-CHMICA	Methyl{2-[1-(cyclohexylmethyl)-1H-indol-3-carboxamido]-3,3-dimethylbutanoat}
MedDRA	Medical Dictionary for Regulatory Activities
mPFC	medialer Präfrontalkortex
MPU	medizinisch-psychologische Untersuchung
mRNA	„messenger RNA“ (Boten-RNA)
MRT	Magnetresonanztomographie
MS	multiple Sklerose
MSN	“medium spiny neurons”
MUSP	Mater-University of Queensland Study of Pregnancy and Outcomes
n	Anzahl der Elemente in der Stichprobe
NAB	Nabilone-Gruppe
NAc	Nucleus accumbens
NADA	N-Arachidonoyl-Dopamin
NESARC-Studie	National Epidemiologic Survey on Alcohol and Related Conditions
NICE	National Institute for Health and Care Excellence
NINCDS-ADRA	National Institute of Neurological and Communicative Disorders and Stroke and the Alzheimer’s Disease and Related Disorders Association
NINCDS-AIREN	National Institute of Neurological and Communicative Disorders and Stroke and the Association Internationale pour la Recherché et l’Enseignement en Neurosciences
NK1-Rezeptor	Neurokininrezeptor
NNH	“number needed to harm”
NNTB	“number Needed To Treat for additional benefit”
NNTH	“number Needed To Treat for additional harm”
NPS	neue psychoaktive Substanzen
NSAID	„non-steroidal anti-inflammatory drug“ (nichtsteroidaler Entzündungshemmer)
OAB	“overactive bladder” (überaktive Blase)
OBC	“overall bladder condition” (Gesamtsituation der Blase)
OCEBM	Oxford Centre for Evidence-based Medicine
OEA	Oleoylethanolamid
OR	Odds-Ratio
p	„probability-value“ (Koeffizient der Signifikanz)
PASAT	Paced Auditory Serial Addition Test
PBO-Gruppe	Placebo-Gruppe
PEA	N-Palmitoylethanolamid
PET	Positronen-Emmissions-Tomographie
PFC	präfrontaler Kortex
PICO	Patients/Interventions/Comparisons/Outcomes
PKA	Proteinkinase A
POMC-Gen	Pro-opiomelanocortin-Gen
PPAR	Peroxisomen-Proliferator-aktivierter Rezeptor

PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PROSPERO	International Prospective Register for Systematic Reviews
PTBS	posttraumatische Belastungsstörung
RAVLT	Rey Auditory Verbal Learning Test
rCBF	„reduction of cerebral blood flow" (Reduktion des regionalen zerebralen Blutflusses)
RCT	"randomized-controlled trial"
RD	"risk difference"
ROBIS	"risk of bias in systematic reviews"
RR	"relative risk"
SAD-CBD	Sweet Afghani Delicious Cannabidiol
SAD-PLAC	Sweet Afghani Delicious Placebo
SAE	„severe adverse event" (schwerwiegendes unerwünschtes Ereignis)
SC	synthetisches Cannabinoid
SDB	systolischer Blutdruck
SDM	Zahlen-Symbol-Test
SE	"standard error" (Standardfehler)
SIGN	Scottish Intercollegiate Guidelines Network
SMD	standardisierte mittlere Differenz
SPECT	Single-Photon-Emissions-Tomographie (Einzelphotonen-Emissionscomputertomographie)
SPM	Raven's Standard Progressive Matrices
SR	systematisches Review
TAO	Thromboangiitis obliterans (Buerger-Syndrom)
TAP	Testbatterie zur Aufmerksamkeitsprüfung
THC	Tetrahydrocannabinol
THC-COOH	THC-Metabolit 11-nor-9-Carboxy-Tetrahydrocannabinol
THCV	Δ^9-Tetrahydrocannabivarin
TOSSA	Sustained Selective Attention Test
TRPV1	"transient receptor potential vanilloid receptor type 1"
UAW	unerwünschte Arzneimittelwirkung
UTI	„urological tract infection" (Infektion des Harntraktes)
VAHCS	Victorian Adolescent Health Cohort Study
VTA	ventrales tegmentales Areal
WMS	Wechsler Memory Scale
ZNS	zentrales Nervensystem
Δ^8-THC	Delta 8-Tetrahydrocannabinol, Cannabinol
Δ^9-THC	Delta 9-Tetrahydrocannabinol