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Alkaloidal drug assay pdf

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This group also includes some related compounds with neutral[2] and even slightly acidic properties. [3] Some synthetic compounds of similar structure can also be called alkaloids. [4] In addition to carbon, hydrogen and nitrogen, alkaloids can also contain oxygen, sulfur and, more rarely, other elements such as chlorine, bromine and phosphorus. [5] Alkaloids are produced by a variety of organisms, including bacteria, fungi, plants and animals. [6] They can be purified from raw extracts of these organisms by extracting acid bases or solvent extractions, followed by silica gel column chromatography. [7] Alkaloids have a wide range of pharmacological activities, including malaria (e.B. ephedrine), cancer (e.g. Homoharringtonin)[8] cholinomimetics (e.B. galantamine)[9] vasodilatory (e.B. vincamines), antiarrhythmics (e. B g. quinidine), analgesic (e.B. morphine)[10] antibacterial (e.B. chelerythrin)[11] and antihyperglycemic activities (e.B). [12] [failed review] Many have found use in traditional or modern medicine, or as a starting point for the discovery of drugs. Other alkaloids have psychotropic (e.g. B psilocin) and stimulating activities (e.B. cocaine, caffeine, nicotine, theobromine)[13] and have been used in entheogenic rituals or as recreational drugs. Alkaloids can also be toxic (e.B. atropine, tubocoin). [14] Although alkaloids affect a variety of metabolic systems in humans and other animals, they almost uniformly evoke a bitter taste. [15] The boundary between alkaloids and other nitrogenous natural compounds is not clear. [16] Compounds such as amino acid peptides, proteins, nucleotides, nucleic acid, amines and antibiotics are not usually referred to as alkaloids. [2] Compounds containing nitrogen in the exocyclic position (mescaline, serotonin, dopamine, etc.) are generally classified as alkaline and not as alkaloids. [17] However, some authors consider alkaloids to be a special case of amines. [19] [19] [20] Designation The article that introduced the concept of alkaloid. The name name Alkaloids were introduced in 1819 by the German chemist Carl Friedrich Wilhelm Meißner and derive from the late Latin root alkali (which in turn comes from the Arabic al-qalī, which means ash of plants) and the suffix –(like). [Inb 1] However, the term only came up after the publication of a review article by Oscar Jacobsen in Albert Ladenburg's chemical dictionary in the 1890s. [21] [22] There is no unique method for naming alkaloids. [23] Many individual names are formed by adding the ine suffix to the species or genre designation. [24] For example, atropine is isolated from the plant *Atropa belladonna*; Strychnine is obtained from the seed of the strychnine tree (*Strychnos nux-vomica* L.). [5] When several alkaloids are extracted from a plant, their names often differ by variations of the suffix: Idine, Anine, Aline, Inine, etc. There are also at least 86 alkaloids whose names contain the root vin because they are extracted from *Vinca* plants such as *Vinca rosea* (*Catharanthus roseus*); [25] these are called vinca alkaloids. [26] [27] [28] History of Friedrich Sertürner, the German chemist who first isolated morphine from opium. Alkaloid-containing plants have been used by humans for therapeutic and recreational purposes since ancient times. For example, medicinal plants have been known in Mesopotamia since about 2000 BC. [29] Homer's *odyssey* referred to a gift given to the Egyptian Pharaoh, a drug that fell into oblivion. It is believed that the gift was an opium-containing drug. [30] A Chinese book on houseplants written in the 1st to 3rd century BC mentioned a medical use of ephedra and opium poppy. [31] Coca leaves have also been used by South American Indians since ancient times. [32] Extracts from plants containing toxic alkaloids such as aconitine and tubosurin have been used to poison arrows since ancient times. [29] Studies on alkaloids began in the 19th century. In 1804, the German opium chemist Friedrich Sertürner isolated a sopofian principle (Latin: principium somniferum), which he called morphine and referred to Morpheus, the Greek god of dreams; in German and some other Central European languages, this is still the name of the drug. The term morphine, which is used in English and French, was given by the French physicist Joseph Louis Gay-Lussac. The French researchers Pierre Joseph Pelletier and Joseph Bienaimé Caventou, who discovered quinine (1820) and strychnine (1818), made a significant contribution to the chemistry of alkaloids in the early years of their development. Several other alkaloids were discovered at the time, including xanthine (1817), atropine (1819), caffeine (1820), conin (1827), nicotine (1828), colchicine Spartin (1851) and cocaine (1860). [33] The development of the chemistry of alkaloids was accelerated by the emergence of spectroscopic and chromatographic methods in the 20th century, so that by 2008 more than 12,000 alkaloids The first complete synthesis of an alkaloid was achieved in 1886 by the German chemist Albert Ladenburg. He produced conin by reacting 2-methylpyridine with acetaldehyde and reducing the resulting 2-propenylpyridine with sodium. [35] [36] Bufotenin, an alkaloid made from some toads, contains an indole nucleus and is produced in living organisms from the amino acid tryptophan. Classifications The nicotine molecule contains both pyridine (left) and pyrrolidine rings (right). Compared to most other classes of natural compounds, alkaloids are characterized by a great structural diversity. There is no uniform classification. [37] Initially, when knowledge of chemical structures was lacking, the botanical classification of the spring plants was used. This classification is now considered obsolete. [5] [38] Recent classifications are based on the similarity of the carbon skeleton (e.B. indole-, isoquinoline- and pyridine-like) or biochemical precursors (ornithine, lysine, tyrosine, tryptophan, etc.). [5] However, they require compromises in border line cases; [37] Nicotine, for example, contains a pyridine fragment of nicotinamide and a pyrrolidine part of ornithine[38] and can therefore be assigned to both classes. [40] Alkaloids are often divided into the following main groups:[41] True alkaloids contain nitrogen in the heterocycle and come from amino acids. [42] Her characteristic examples are atropine, nicotine and morphine. This group also includes some alkaloids containing terpenes (e.B. evonin[43]) or peptide fragments (e.B. ergotamine[44]) in addition to the nitrogen heterocycle. The piperidinialkaloids conin and concine can be considered as real alkaloids (instead of pseudoalkaloids: see below)[45] although they do not come from amino acids. [46] Protoalkaloids containing nitrogen (but not the nitrogen heterocycle) and also derived from amino acids. [42] Examples include mescan, adrenaline and ephedrine. Polyamine alkaloids – derivatives of putresin, spermidine and spermine, peptide and cyclopeptide alkaloids. [47] Pseudoalkaloids – alkaloid-like compounds that do not originate from amino acids. [48] This group includes terpene-like and steroid-like alkaloids,[49] as well as purine-like alkaloids such as caffeine, theobromine, theacrine and theophylline. [50] Some authors classify as pseudoalkaloids such compounds as ephedrine and cathinone. These come from the amino acid phenylalanine, but acquire their nitrogen atom not from the amino acid, but through transamination. [50] [51] Some alkaloids do not have the carbon-containing skeleton that is characteristic of their group. Thus, galantamine and homoaporphins do not contain an isochnolin fragment, but are generally attributed to isochnolin alkaloids. [52] The main classes of monomeric alkaloids are listed in the table below. Class Main Groups Main Synthesis Steps Examples with nitrogen heterocycles (true alkaloids) pyrrolidine derivatives[53] ornithine or arginine – – – N-methylputrescin – N-methyl-pyrroine [54] cuscohygrine, hygrin, hygroline, stachydrin[53][55] tropan groupsubstitution in positions 3, 6 or 7 ornithine or arginine – putrescin – N-methylputrescin – N-methylpyrrolin [54] Scopopolaline, hyoscyamine[53][56][57] Cocaine group substitution in positions 2 and 3 cocaine, ecgonine [56][59] Pyrrolizidine derivatives[59] Non-ester in plants: or nithine or arginine – putrescine – homosperrmidine – retronecine [54] Retronecine, heliotridine, laburnum [59][60] Complex esters of monocarboxylic acids Indicin, Lindelophin, Sarracin [59] Macrocylic Diester Platyphyllin, Trichodesmine[59] 1-Aminopyrrolizidine (Loline) In fungi: L-proline + L-homoserin – N-(3-amino-3-carboxypropyl)proline – norloline[61][62] Loline, N-Formylloin, N-Acetylloline[63] Piperidine Derivatives[64] Lysine – Cadaverine – Piperids [65] Sedamine, Lobeline, Azaferine, Piperine [45][66] Octanic Acid – Concine – Conin [46] Cocin [46], concine[46] Quinolizidal derivatives[67][68] Lupinine group lysine – cadaverine – piperids [69] lupinin, Nupharidine [67] Cytisingroup Cytisin [67] Sparteine group Sparteine, Lupanin, Anahygrine[67] Matrine group, Matrin, oxymatine, allomatridine[67][70][71] ormosanin group ormosanin, piptantin[67][72] indolizine derivatives[73] lysine – δ semialdehyde of α-aminoacipic acid – pipeglass acid – 1 indolizinoine [74] swainnonin, Castanospermin [75] Pyridine derivatives[76][77] Simple derivatives of pyridine nicotinic acid – dihydronicotic acid – 1,2-dihydropyridine [78] trigonelline, Ricinin, Arecoline [76][79] Polycyclic non-condensing pyridine derivatives nicotine, nornicotine, anabasin, anatabine [76][79] Polycyclic condensed pyridine derivatives actinidine , gentianin , pedicularine [80] sesquiterpenpyridine derivatives nicotinic acid, isoleucine [20] evonin, hippocracy, Triptonin [77][78] Isochnolin derivatives and related alkaloids [81] Simple derivatives of isoquinolin [82] Tyrosine or phenylalanine – dopamine or tyramine (for alkaloids amarillis) [83][84] Salsoline, Lophoc derivatives of 1- and 3-isoquinoids [85] N-methylcoriddaline, noroxyhydrastine [85] Derivatives of 1- and 4-phenyltetrahydroisoquinoids [82] Cryptostilin [82][86] Derivatives of 5-n atili isoquinoline [87] Ancistrocladin [87] Derivatives of 1- and 2-benzyl-izoquinolines [88] Papaverine , laudanosine, sendaverine cularin group[89] Cularine, Yagonein [89] Pavines and isopavines [90] Argemonesin, Amurensine [90] Benzopyrrolines [91] Cryptaustoline [82] Protoberberine [82] Berberberine, Canadine, Ophiocarpine, Mecambridin, Corydaline [92] Phthalidisoquinonoline [82] Hydrastin, Narconation (noscapin) [93] spirobercylisoquinolines [82] fumarin [90] Ipeacacuanha alkaloids[94] Emetine, protoemetin, ipeco [94] Benzophenanthridine [82] Sanguinarine, oxyntidine, corynoloxin [95] aporphins [82] glaucin, coridin, [96] Proaporphins [82] Pronuciferins, Glaziolein [82][91] Homoaporphins [97] Creysiginin, Multifloramine [97] Homoproaporphins [97] Bulbocodine [89] Morphine[98] Morphine, Codeine, Thebain, Sinomen [99] Homomorphine [100] Cresigycinin, Androcymbin [98] topoloisoquinoin [82] Imerubrine [82] Azolfluoroanthenes [82] Rufescin, Imeluteine [101] Amaryllis alkaloids[102] Lycorine, ambelin, tatin, Galantamine, Montanin [103] Erythrina al Kaloid[86] Erythroiadine [86] Phenanthrene derivatives [82] Atherosperminin [82][92] Protopine [82] Protopine , Oxomuramine , Corycavidin [95] Aristolactam [82] Doriffavin [82] Oxazole derivatives[104] Tyrosine – Tyramine [105] Annuloline, Halfordinol, Texalin, texam[106] Isoxazole derivatives icar icric acid – muscimolic icuation acid, Muscimol Thiazol Derivatives[107] 1-Deoxy-D-Xylulose 5-Phosphate (DOXP), Tyrosine, Cysteine [108] Nostocyclamide, Thiostreptones [107][109] Quinazoinderide 3,4-Dihydro-4-Chinazolonone derivatives Anthranilic acid or phenylalanine or ornithine [111] Febrifugin[112] 1,4-dihydro-4-quinazolonone derivatives glycorin , arborin, glyc Pyrrolidine and piperidine quinazolin derivatives vazine (peganin) [104] acridine derivatives[104] Anthranilic acid [113] Rutacridone , acronine[114][115] quinoline derivatives[116][117] Simple derivatives of quinoline derivatives of 2-quinolones and 4-quinolone anthranilic acid – 3-carboxyquinolines [118] cusparin, Echinopsine, evocarpin[117][119][120] Tricyclic Terpenoid Sfingersine[117][121] Furanquinin derivatives dictamnine, fagarins, Skimmianine[117][121] 11[7][122][123] Quinines Tryptophan – Tryptamine – Tryptosidine (with secologanin) – corinanetal – cinchonin [84][118] Quinine , Quindine, Cinchonine, Cinchonidin [121] Indole derivatives[99] See also : Indole alkaloids non-isoprene indole alkaloids Simple indole derivatives [124] Tryptophan – tryptamine or 5-hydroxytryptophane [125] serotonin, psilocybin, dimethyltryptamine (DMT), bufotenin [126][127] Simple derivatives of β-carboline [128] Harman, Eleagin [124] Pyrrolindole alkaloids [129] Physostigmine (esetin), etheramin, physovosin, epistaglin[129] S Emitterpenoid indole alkaloids Ergot alkaloids[99] Tryptophan – chaocloavine – agroclavine – elimoclavine – paspalpic acid – lysergic acid [129] ergotamine , ergobasine, ergosin[130] Monoterpeneoid indole alkaloids Corynanthe type alkaloid [125] Tryptophan – tryptamine – strictosidine (with secologanin) [125] Ajmalicine , sarapagin, vobasine, ajmaline, yohimbine, reserpine, miltiragynine [131][132] group strychnine and (strychninbrucin, aquaminin, Vomcin [133]) Iboğa alkaloids[125] Ibogamin, ibogaine, voacangine[125] Aspi dosperma alkaloids[125] Vincamine, Vinca alkaloids,[26][134] Vincidine, Aspidosperm imidazole derivatives[104] Directly from histidine[137] Histamine, pilocarpine, pilosine, stevensin[104][137] Purine derivatives[138] Xanthosin in purine biosynthesis[138] 7-methylxantosine – 7-methylxanthine – theobromine – caffeine [84] Caffeine, theobromine, theophylline, saxitoxin [139][140] Alkaloids with nitrogen in the side chain (protoalkaloids) β-Phenylethylamine derivatives[91] Tyrosine or phenylalanine – dioxyphenylalanine – dopamine – adrenaline and mescaline tyrosine – tyramine phenethylamine – 1-phenylpropane-1,2-dione – cathinone – ephedrine and pseudoephedrine [20][51][141] Tyramine, ephedrine, pseudoephedrine, mescaline, cathinone, catecholamines (adrenaline, noradrenaline, dopamine)[20][142] Colchicine alkaloids [143] Tyrosine or phenylalanine – dopamine – autumnaline – colchicine [144] Colchicine, colchamine[143] Muscarine [145] Glutamic acid – 3-ketoglutaric acid – muscarine (with pyruvic acid)[146] Muscarine, aldomuscarine, epimuscarine, epialdomuscarine[145] Benzylamine[147] Phenylalanine with valine, leucine or isoleucine[148] Capsaicin, dihydrocapsaicin, nordihydrocapsaicin, vanillylamine[147][149] Polyamines alkaloids Putrescine derivatives[150] ornithine – putrescine – spermidine – spermine[151] Paucine [150] Spermidine derivatives[150] Lunarine, Conodoncarpine[150] Spermin derivatives[150] Verbasценine, Aphetladrine [150] Peptide (Cyclopeptide) Alkaloid Peptidal Alkaloids with a 13-headed cycle [47][152] Nummularin C type From various amino acids [47] Nummularin C, Nummularin S [47] Ziziphin type Ziziphin A, Sativanin H [47] Peptidal kaloids with a 14-headed cycle [47][152] Frangulianin type frangulianin, Scutianin J [152] Scutianin A Type Scutianin A [47] Intergerine Type Interine, Discarin e D [152] Amphibine F Type Amphibine F, Spinanin A [47] Amfibin B Type Amphibian B, Lotusin C [47] Peptidal kaloids with 5s-headed cycle [152] Mucronine A Type Mucronine A [44][152] Pseudoalkaloids (terpenes and steroids) Diterpene [44] Lycotonine type mevalonic acid – isopentenyl pyrophosphate [153] [154] aconitine, dolphinin [44][155] steroids[156] cholesterol , arginine[157] solasodine, solanandine, veralkamin, batrachotoxin[158] Properties head of a lamb , which was born of a sheep that aated leaves of the maize lily plant. The cyclopia is induced by the cyclopamine present in the plant. Most alkaloids contain oxygen in their molecular structure; these compounds are usually colorless crystals under ambient conditions. Oxygen-free alkaloids such as nicotine[159] or coniin[35] are typically volatile, colorless, oily liquids. [160] Some alkaloids are colored, such as berberine (yellow) and sanguinarine (orange). [160] Most alkaloids are weak bases, but some, such as theobromine and theophylline, are amphoter. [161] Many alkaloids dissolve poorly in water, but dissolve easily in organic solvents such as demethyl ether, chloroform or 1,2-dichlothane. Caffeine,[162] cocaine,[163] codeine[164] and nicotine[165] are easily soluble in water (with a solubility of ≥1g/L), while including morphine[166] and yohimbine[167] very much water soluble (0.1-1 g/l). Alkaloids and acids form salts of different strengths. These salts are usually soluble in water and ethanol and poorly soluble in most organic solvents. Exceptions are scopolamy hdrobromide, which is soluble in organic solvents, and water-soluble quinine sulfate. [160] Most alkaloids have a bitter taste or are toxic when ingested. Alkaloid production in plants appeared to have evolved in response to herbivorous feeding; however, some animals have developed the ability to detoxify alkaloids. [168] Some alkaloids may produce developmental defects in the offspring of animals that consume but cannot detoxify the alkaloids. An example is alkaloid cyclopadin, which is produced in the leaves of corn lily. In the 1950s, up to 25% of lambs born to sheep grazing on corn lily had severe facial deformations. These ranged from deformed jaws to cyclopies (see picture). After decades of research, in the 1980s, the compound responsible for these deformities was identified as alkaloid 11 deoxyervine, later renamed cyclopamine. [169] Distribution in nature Strychnine tree. Its seeds are rich in strychnine and brucine. Alkaloids are produced by various living organisms, especially higher plants – about 10 to 25% of which contain alkaloids. [170] [171] Therefore, the term alkaloid has been associated with plants in the past. [172] The alkaloid content in plants is usually within a few percent and is inhomogeneous above the plant tissue. Depending on the plant species, the maximum concentration is observed in the leaves (black henbane), fruits or seeds (strychnin tree), root (*Rauwolfia serpentina*) or bark (*Cinchona*). [173] In addition, different tissues of the same plants may contain different alkaloids. [174] In addition to plants, alkaloids are found in certain fungal species, such as psilocybin in the fungus of the genus *Psilocybe*, and in animals such as bufotenin in the skin of some toads [23] and a number of insects, disinfectants. [175] Many marine organisms also contain alkaloids. [176] Some veins, such as adrenaline and serotonin, which play an important role in higher animals, resemble alkaloids in their structure and biosynthesis and are sometimes referred to as alkaloids. [177] Extraction crystals of piperine obtained from black pepper. Due to the structural diversity of alkaloids, there is no single method of extracting them from natural raw materials. [178] Most methods use the property of most alkaloids to be soluble in organic solvents [7], but not in water, and the opposite tendency of their salts. Most plants contain several their mixture is extracted first and then individual alkaloids are separated. [179] Plants are thoroughly ground before extraction. [178] [180] Most alkaloids are present in the raw plants in the form of salts of organic acids. [178] The extracted alkaloids can remain salts or turn into bases. [179] The basic extraction is determined by the processing of the raw with alkaline solutions and extraction of alkaloid bases with organic solvents, such as 1,2-dichoethane, chloroform, diethyl ether or benzene. Then the impurities are dissolved by weak acids; This converts alkaloid bases into salts that are washed away with water. If necessary, an aqueous solution of alkaloid salts is again prepared alkaline and treated with an organic solvent. The process is repeated until the desired purity is reached. During acid extraction, the vegetable raw material is processed by a weak acidic solution (e.B. acetic acid in water, ethanol or methanol). A base is then added to convert alkaloids into basic forms extracted with organic solvent (if the extraction was done with alcohol, it is first removed and the rest is dissolved in water). The solution is cleaned as described above. [178] [181] Alkaloids are separated from their mixture with their different solubility in certain solvents and different reactivity with certain reagents or by distillation. [182] A number of alkaloids are identified by insects, among which the fire ameimomalaloids, known as solenopsins, have received greater attention from researchers. [183] These insect alkaloids can be efficiently extracted by solvent immersion of live fire ants [7] or by centrifugation of living ants [184] followed by silica gel chromatography cleaning. [185] The tracking and dosing of the extracted solenopsin antalalaloids was described as possible due to their absorption peaks of about 232 nanometers. [186] Biosynthesis Biological precursors of most alkaloids are amino acids such as ornithine, lysine, phenylalanine, tyrosine, tryptophan, histidine, acetic acid and anthranic acid. [187] Nicotinic acid can be synthesized from tryptophan or aspartic acid. Ways of alkaloid biosynthesis are too numerous and cannot be easily classified. [84] However, there are some typical reactions involved in the biosynthesis of different classes of alkaloids, including the synthesis of ship bases and mannich reaction. [175] Synthesis of ship bases Main article: Ship base ship bases can be obtained by reaction of amines with ketones or aldehydes. [188] These reactions are a common method of producing C–N bonds. [189] In the biosynthesis of alkaloids such reactions can take place within a molecule.[187] as in the synthesis of piperidine:[40] Mannich reaction Main article: Mannich reaction An integral part of the Mannich reaction, in addition to an amine and a carbonyl compound, is a carbanion that plays the role of the nucleophile in the nucleophilic addition to the carbon effect of the amine. [189] The Mannich reaction can be both intermolecular and intramolecular run:[190][191] Dimer alkaloids In addition to the monomeric alkaloids described above, there are also dimer iced and even trimer iced and tetrameric alkaloids, which are formed in condensation of two, three and four monomeric alkaloids. Dimeral alkaloids are usually taken from of the same type by the following mechanisms:[192] Mannich reaction, which e.B. leads to voacamine-Michael reaction (villalstonin) condensation of aldehydes with amines (toxiferin) oxidative addition of phenols (dauricin, tubourisurine) lactonization (carpain). Voacamine Villalstonine Toxiferine Dauricine Tubocurarine Carpainе There are also dimeral alkaloids formed from two different monomers, such as vinca alkaloids vinblastine and vincristine,[26][134], which are formed from the coupling of catharsand and vindoline. [193] [194] The newer semi-synthetic chemotherapy drug Vinorelbine is used in the treatment of non-small cell lung cancer. [134] [195] It is another derived dimer of vindoline and catharsarton and is synthesized from anhydrovinblastine.[196] either from leurosins[197][198] or the monomers themselves. [134] [194] Biological role The role of alkaloids in the living organisms that produce them is still unclear. [199] Initially, it was assumed that alkaloids are the end product of nitrogen metabolism in plants, such as urea in mammals. Later it was shown that the alkaloid concentration varies over time, and this hypothesis was refuted. [16] A number of ants are suggested to produce alkaloids as poison components, but the exact biosynthesis pathways have not been empirically proven. [175] [200] Most known functions of alkaloids are related to protection. For example, aporphin alkaloid Iriodermine, produced by the tulip tree, protects it from parasitic fungi. In addition, the presence of alkaloids in the plant prevents insects and choral animals from eating them. However, some animals are adapted to alkaloids and even use them in their own metabolism. [201] Such alkaloid-related substances as serotonin, dopamine and histamine are important neurotransmitters in animals. Alkaloids are also known to regulate plant growth. [202] An example of an organism that uses alkaloids for protection is the *Utetheisa ornatrix*, better known as the ornate moth. Pyrrolizidine alkaloids make these larvae and adult moths inedible to many of their natural enemies such as coccinellid beetles, green lace wings, insect-eating hemiptera and insect-eating bats. [203] Another example of the use of alkaloids can be found in the Gifthemlock motte (*Agonopterix astromeriana*). This moth feeds on its highly toxic and alkaloid-rich host plant poison Hemlock (*Conium maculatum*) during its larval stage. A. astromeriana can benefit from the toxicity of naturally occurring alkaloids in two respects, both by the unpalatability of the species towards predators and by the ability of A. astromeriana to recognize conium maculatum as the right place for the opium. [204] Fire ant poison alkaloid known as solenopsin has been shown to protect queens of invasive fire ants during the creation of new nests, thus playing a central role in the spread of this pest species around the world. [205] Applications in Medicine The use of alkaloid-containing plants has a long history, and so when the first alkaloids were isolated in the 19th century, they were immediately used in clinical practice. [206] Many alkaloids are still used in medicine, usually in the form of salts that are commonly used, including the following:[16][207] Alkaloid Action Ajmalin Antiarrhythmic Emetin antiprotozoal Agent, Emesis Ergot Alkaloids Vasoconstriction, hallucinogenic, Uterotonic Glauicine Antitussive Morphine Analgesic Nicotine Stimulant, nicotinic acetylcholine receptor

agonist physostiglin inhibitor of acetylcholinesterase Quinidine Antiarhythmicine Quinpyretic, Antimalarial Reserpine antihypertensive Tubocurarine Muscle relaxant Vinblastine , vincrin, antihypertensive yohimbine stimulant, aphrodisiac many synthetic and semi-synthetic drugs are structural modifications of alkaloids that have been designed to improve or alter the primary effect of the drug and reduce unwanted side effects. [208] Naloxone, an opioid receptor antagonist, is, for example, a derivative of thebain that is present in opium. [209] Thebain naloxone In agriculture, some alkaloids, such as nicotine salts and anabasin, were used as insecticides prior to the development of a wide range of relatively low-toxic synthetic pesticides. Their use has been limited by their high toxicity to humans. [210] Use as psychoactive drugs preparations of plants containing alkaloids and their extracts, and later pure alkaloids, have long been used as psychoactive substances. Cocaine, caffeine and cathinone are stimulants of the central nervous system. [211] [212] Mescaline and many indole alkaloids (such as psilocybin, dimethyltryptamine and ibogaine) have hallucinogenic effects. [213] [214] Morphine and codeine are strong narcotic painkillers. [215] There are alkaloids that do not themselves have a strong psychoactive effect, but are precursors to semi-synthetic psychoactive drugs. For example, ephedrine and pseudoephedrine are used to produce methcathinone and methamphetamine. [216] Thebain is used in the synthesis of many painkillers such as oxycodone. See also Amine Base (Chemistry) List of Toxic Plants Natural Products Palau'amin Secondary Metabolite Mayer's Reagent Notes - In the penultimate sentence of his article, W. Meissner (1819) On Plant Alkalis: II. About a new plant alkali (alkaloid) (On vegetable alkalis: II. On a new plant alkali (alkaloid)), Journal of Chemistry and Physics, 25: 379-381 ; Available online at: Hathi Trust – Meissner wrote: In general, it also seems appropriate not to name the plant substances known until now, since they are nevertheless very much in some properties of the alkalis, they would find in the section of plant chemistry before the plant acids of their place. (I. e. In general, to impose the name alkalis on the currently known plant substances, because they differ greatly from lye in some properties; Under the chapters of plant chemistry, they would therefore find their place before plant acids [because alkaloid acid (acid) would precede, but alkalis would follow].) References: Andreas Luch (2009). Molecular, clinical and environmentally harmful toxicology. Springer. P. 20. ISBN 978-3-7643-8335-0. A b IUPAC, Compendium of Chemical Terminology, 2nd ed. (the Gold Book) (1997). Online corrected version: (2006–) alkaloids. doi:10.1351/goldbook.A00220 - R. H. F. 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Abgerufen von 2 4-Quinolone Namen Andere Namen Andere Namen 1H-Quinoln-4-eins Identifikatoren CAS Nummer 529-37-3 33 3D Modell (JSmol) Interaktives Bild CHEBI CHEBI:155900 ECHA InfoCard 100.009.336 EC-Nummer 210-268-2 PubChem CID 69141 UNII M1O131WXFO CompTox Dashboard (EPA) DTXSID50209980 Inchi InChI=1S/C9H7NO/c11-9-5-6-10-8-4-2-1-3-7(8)9/h1-6H,(H,10,11)Schlüssel: PMZDQRJGMBQQB-FUHFFFAOYSA-N SMILES C1=CC =C2C(=C1)C(=O)C=CN2 Eigenschaften Chemische Formel C9H7NO Molmasse 145.161 g·mol-1 Schmelzpunkt 208–210 °C (406–410 °F; 481–483 K) Sofern nicht anders angegeben, für Materialien im Standardzustand (bei 25 °C, 100 kPa) werden Daten angegeben. Infobox References 4-Quinolone is an organic compound derived from quinoline. It and 2-Chinolone are the two most important parent (i.e. simplified) quinolones. 4-Quinolone is in balance with a small tautomer, 4-hydroxyquinoline (CAS-611-36-9). Aside from pedagogical interest, 4-quinolone is of little intrinsic value, but its derivatives, the 4-quinolone antibiotics represent a large class of important drugs. [1] The tautomeric balance in relation to 4-quinoline (right) and 4-hydroxyquinoline (left) synthesis Synthesis of quinolones quinolones Ring-closing reactions. [2] Such reactions often install a hydroxyl group (an OH function) group on the carbon versus the ring nitrogen (i.e. the C-4 positions). An example of such synthesis is the camps cyclization, which, depending on the starting material and reaction conditions, can give both 2-hydroxyquinolines (B) and 4-hydroxyquinolines (A), as shown. The hydroxychinoine tautomerize to the quinolones. References: Andriole, VT The Quinolones. Academic Press, 1989. Sñi, Pengfei; Wang, Lili; Chen, Kehao; Wang, Jie; Zhu, Jin (2017). Co(III)-Catalyzed Enaminone-Directed C-H Amidation for Quinolone Synthesis. *Organic letters*. 19: 2418-2421. doi:10.1021/acs.orglett.7b00968. 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