

**Drug half-life list:**

Caffeine: 6.22 h (in adults), ~3 h (in children), 4.5-6.66 h (in dogs), 5-11 h (in monkeys), 40-72 min (in mice/rats)

L-Theanine: 1.2 h

L-Tyrosine: 3 h

L-Tryptophan: 2.2 h

L-DOPA: 90 min

Ibuprofen: 1.58 h

5-HTP: 1.8 h

Melatonin: 38.15 min

Ashwaganda: 61.2 min (withaferin-A)

GABA: 5.2 h (17 min in mice)

Ginger Root: 2 h

Magnesium Oxide: 27.7 h

Aluminum Chloride: 3 h

Passionflower: 2.5 h

Apigenin (found in Chamomile): 12 h (92 h in mice)

Valerian/Lemon balm:  $1.1 \pm 0.6$  h

St Johns Wart: 24 h

Alpha GPC:  $6.82 \pm 6.8$

Ginseng: 7.82 h (27 m in mini-pigs) (0.8 h in rabbits)

Niacin: 0.9 h

Buspirone: 2.16 h

Oxytocin: 5.9 min 28 min (in CSF)

Dopamine: 1.9 min (in plasma) 200 ms (in synapse)

Catnip:  $29.4 \pm 1.7$  min (own data)

Setraline: 26 h

Tetanus Antibodies: 14 years

Rabies Vaccine/Antibodies: 3 years (own data)

Withanolide: 45 min

Withanolides: 60 min

Hops extract (*Humulus Lupulus*): 20 h

Beta-Endorphins: 38.6 min

Methylphenidate: 1.71 h

DexMethylphenidate: 4.6 h

Doxylamine succinate: 10.8 h

Olanzapine (oral): 26.66 h

$\beta$ -alanine: 25 min

Tylenol: 2.31 h

Valproic acid: 11.55 h

Taurine: 0.9855 h

Rhodiola: 0.93 h

Methylphenethylamine: 4 min

Phenethylethylamine: 6.9 min

Phenylalanine: 11.55 h

CBD: 2 h (34 h metabolite)

Cariprazine: 117.58 h

Nicotine: 2.31 h

d-Glucose: 14.3 min

L-Arginine: 1.27 h

Kava: 1.3 h

D-Amphetamine: 11.1 h

Amphetamine: 3.96 h

Gabapentin: 6.52 h

Lamotrigine 12.37 h

Prolactin: 23.7 min

Serotonin: 7 min (in brain) 6 days (in plasma)

Hyaluronidase (in wasp venom [0.01 mg]): 49 h (in skin)  $2.1 \pm 0.2$  min

Melattin (in bee venom [75 ug]): 30 h

Apamin (in bee venom [75 ug]): 2 h

Acetylcholine: 2 ms (in brain) 2 min (in plasma)

Azithromycin: 28.13 h

Nitric Oxide: 6 sec

Alprazolam: 10.9 h (oral) 11.24 h (IV)

Met-Enkephalin: 12.2 min

Leu-Enkephalin: 14.8 min

Diazepam: 23 h

Piracetam: 5 h

LSD: 2.6 h

THC: 30 min (34 h metabolite)

THCA: 3.4 h

Phenibut: 5.3 h

Vitamin D: 15 day (in circulation) 8 weeks (in adipose tissue)

Aluminum zirconium: 3.27 day

Capsaicin: 25 minutes

Citric Acid: 2.3 h

Fentanyl: 1.98 h

Morphine: 2.86 h

Heroin: 2.95 min

MDMA: 7 h

Theobromine: 6.6 h

**Caffeine:**

Dosage:

$[\text{dose}/(0.7 \cdot m)]$  formula for mg/L

KD is 0.466 mg/L (at the adenosine A2a receptor)

KD at the adenosine receptor A1 is 2.33 mg/L

adenosine A2B receptor: 2.53

and adenosine A3 receptor is 15.54 mg/L

1.4 mg/kg Can possibly lead to insomnia

2 mg/kg Delays fatigue & increases alertness

3 mg/kg Causes relaxing effect, with elevated mood

4 mg/L increases Serotonin 20% above baseline

10 mg/kg-30 mg/kg increases dopamine by 100-125 units

13 mg/L blocks 50% adenosine

5 mg/kg Increase Norepinephrine. Increase Epinephrine by 50%.

6 mg/kg Safe-limit

7 mg/kg to inhibit the release of GABA & cause euphoria.

9 mg/kg to increase Epinephrine levels by 100% above baseline.

It takes about 10 mg/kg to cause panic attacks, also increases Glutamate by 50 units

15 mg/kg can cause twitching and vomiting and even psychotic delirium with full recovery in 6 hours

15 mg/L is the mild toxic dose eg: nervousness, irritability, and potential nausea, palpitations, tremors, perspiration, paresthesia.

80 mg/kg causes unconsciousness

15 mg/L is the lowest concentration to ever cause death (one case)

2 g (30 mg/kg) usually results in hospitalization

Toxic dose 50 mg/L

LD50 187 mg/L

Highest dose ever survived 50 g

187±96 (LD50±SD)

LD100 567 mg/L

LD50 in rats: 192 mg/kg

Caffeine anxiety LOAEL 9 mg/kg

Caffeine anxiety NOAEL 3 mg/kg

Caffeine headaches LOAEL 6 mg/kg

Caffeine headaches NOAEL 3 mg/kg

Caffeine insomnia LOAEL 6 mg/kg

Caffeine insomnia NOAEL 3 mg/kg

400 mg reaches steady state in 18 hours (3 half-lives)

The lowest dose to ever cause death was 3,600 mg

EC50 551±81 micromole

Coffee:

Robusta beans are 2.7% caffeine, while Arabica beans are 1.5% of caffeine

Dunkin' Donuts = 210 mg caffeine

Starbucks = 25 mg/100 ml coffee

1 Tablespoon of folgers classic roast = 71 mg

1 Teaspoon of folgers instant coffee = 74 mg

1 K-cup folgers classic roast = 100-150 mg

300 mg in 4.9 g of deathwish instant coffee

Half-Life

Caffeine has a long half-life (2-12 hours) that may vary depending on many factors, although the average half-life is 6.22 hours.

Nicotine (half-life 2 hours) can reduce the half-life of caffeine by 50%, and alcohol consumption can increase the half-life of caffeine by 72%! In women the half-life is 10.5 hours during the last 4 weeks of pregnancy, 97.5 hours in a newborn, 14 hours in a 3-5 month old baby, and 2.6 hours in a baby older than 6 months! The half-life of caffeine in dogs is 6.66 hours, while in 1 day old puppies it is 47.5 hours.

Equivalence to other drugs:

5 mg of Ritalin is about 100 mg of Caffeine

600 mg of Caffeine is equal to a small dose of Amphetamine

Misc

Molar mass: 194.19 g/mol

Molecular formula: C<sub>8</sub>H<sub>10</sub>N<sub>4</sub>O<sub>2</sub>

Volume of distribution 0.7 L/kg

Clearance rate 0.078 L/kg/h

Half-life 6.22055 hours

Tmax 0.5 hours

Absorption half-life 0.08 hours

#### **L-theanine:**

##### Dosage

It takes ~0.15 mg/kg of L-theanine to feel the effects

Dosage is 3 mg/kg every 3 hours

Dosage for sleep 20 mg/kg (decreases sleep latency by 14.9%, sleep duration increase 26.8%)

LD50 (lethal dose 50%) is 5,000 mg/kg

NOAEL is 4,000 mg/kg

##### Affected Neurotransmitters

L-theanine works by blocking the stimuli in glutamate and increasing the production of GABA, serotonin, dopamine, norepinephrine, epinephrine, oxytocin, and acetylcholine. L-theanine enhances the endocrine system.

L-theanine can increase dopamine to 300% in the interstitium.

##### Half-Life

L-theanine has a half-life of 1.2 hours.

AUC is 57.1 L/h  $\pm$  3.6

Volume of distribution is 17.1 L

Absorption rate constant is 2.31 hours

Absorption half-life 0.3 hours

L-theanine reaches a peak effect in 48 minutes

##### Bio-availability

The bioavailability of l-theanine is 47-54%

Misc

Molecular formula:  $C_7H_{14}N_2O_3$

Molar mass: 174.2 g/mol

Bulk density: 0.42 g/mL

**Melatonin:**

Dosage

The minimum dosage for melatonin is 0.003 mg/kg

Dosage is 0.05 mg/kg.

Melatonin levels can go as high as 1,000% at 1 mg and 10,000% at 3-5 mg

Half-Life

The half-life of melatonin is 38.15 minutes.

Peak Time

Melatonin reaches a peak affect in about 19 minutes.

Constant absorption rate

Melatonin absorption half-life: 6 minutes

Decay rate

Melatonin decay rate is: ~0.018 minutes

Volume of distribution is 1.2 L and clearance rate is 0.0218 L/min

Basal values in morning 10 pg/mL

Basal values at night 60 pg/mL

Oral bioavailability 15%

LD50 i.p. mouse 1168 mg/kg (1131 mg/kg in rat)

LD50 oral mouse 1250 mg/kg (>3200 mg/kg rat)



LD50 s.c. mouse >1600 mg/kg (same for rat)

LD50 i.v. mouse 472 mg/kg (rat 356 mg/kg)

**GABA:**

Dosage for calming effects: 1.4 mg/kg

Dosage for sleep: 100 mg/kg (sleep frequency decrease 20.7%, increase sleep duration 87.3%)

Doses at 150-300 mg are shown to improve sleep

GABA taken at doses of 5 mg/kg increase GABA to 200%-300% above baseline

Increases GABA 33% above baseline in the brain

Increases GABA 383.3% above baseline combined with L-arginine

LD50 is 12,680 mg/kg

NOAEL 500 mg/kg

LDLO 2,400 mg/kg

The half-life 5.28 hours (17 minutes in mice)

Tmax: 1.5 hours (0.75 - 2)

Clearance rate 2090.38 L/h  $\pm$  85.17% (34.16 L/kg)

Volume of distribution 15924.6 L  $\pm$  116.84% (260.2 L/kg)

absorption half-life: 0.36 hours

3 g (34 mg/kg) increases H.G.H. by 400% above baseline

5 g increases H.G.H. by 550% above baseline

Baseline GABA levels 0.01 mg/L

Nitric Oxide helps GABA pass blood brain barrier; L-arginine increases Nitric Oxide

**L-Tyrosine:**

L-tyrosine dosage is 12.5 mg/kg per dose and 150 mg/kg in a day.

Food/Drinks

There is about 420 mg of l-tyrosine in skimmed milk (per cup)

411.25 mg in semi-skimmed milk (per cup)

393.75 mg in buttermilk (per cup)

385 mg in whole milk (per cup)

297.5 mg in sour cream (per cup)

96.25 mg in butter (per cup)

253.75 mg in an egg (per cup)

428.75 mg of tyrosine in natural yogurt (per cup)

708.75 mg in fat-free natural yogurt (per cup)

1,163.75 mg in grilled steak (per 3 oz cooked)

1,11.25 mg in beef sirloin & beef ribs (per 3 oz cooked)

1,067 mg in beef tenderloin (per 3 oz cooked)

1,015 mg in lamb shoulder (per 3 oz cooked)

980 mg in New Zealand and Australian lamb (per 3 oz cooked)

962.5 mg in stewing lamb (per 3 oz cooked)

1,312 mg in bacon (per 3 oz cooked)

1,137.5 mg in low fat ground pork (per 3 oz cooked)

1,023.75 mg in pork sirloin (per 3 oz cooked)

980 mg in pork ribs (per 3 oz cooked)

971.25 mg in ham (per 3 oz cooked)

962.5 mg in loin of pork (per 3 oz cooked)

901.25 mg in pork tenderloin and pork shoulder (3 oz cooked)

857.5 mg in tuna(3 oz cooked)

752.5 mg in snapper (3 oz cooked)

745 mg in mackerel (3 oz cooked)

735 mg in shrimp (3 oz cooked)

726.25 mg in halibut (3 oz cooked)

665 mg in haddock (3 oz cooked)

560 mg in crab (3 oz cooked)

#### Affected Neurotransmitters

L-tyrosine is a precursor to the neurotransmitters dopamine, norepinephrine, and epinephrine.

It is also said that L-tyrosine can indirectly increase endorphins.

#### Half-Life

The half-life of L-tyrosine has been determined to be 3 hours, and reach baseline levels in 3-8 hours on average.

Tmax: 30 minutes

Absorption half-life: 0.097 hours

Increases dopamine by 120%

#### **L-tryptophan:**

L-Tryptophan is a natural amino acid, 3% of it synthesis into 5-HTP, and 5-HTP synthesis into serotonin, serotonin into melatonin.

Volume of distribution 0.82 mL/g

Clearance rate 0.0043 mL/g/min

Half-life 2.2 hours

Tmax 85±5 minutes

Absorption half-life 31 minutes

	L-tryptophan <sup>*</sup> (mg)	Sum of CAAs <sup>**</sup> (mg)	Ratio
Turkey, Skinless, Boneless, Light Meat (per pound, raw)	410	9,525	0.043
Chicken, Skinless, Boneless, Light Meat (per pound, raw)	238	5,122	0.046
Turkey, Skinless, Boneless, Dark Meat (per pound, raw)	303	7,036	0.043
Chicken, Skinless, Boneless, Dark Meat (per pound, raw)	256	5,492	0.047
Whole Milk (per quart)	732	8,989	0.081
2% Milk (per quart)	551	12,516	0.044
Wheat Bread (per slice)	19	317	0.060
White Bread (per slice)	22	439	0.050
Semisweet Chocolate (per ounce)	18	294	0.061
Sweet Chocolate (per ounce)	16	270	0.059
Canned Tuna (per ounce)	472	10,591	0.045
Cheddar Cheese (per ounce)	91	2,298	0.040
Peanuts (per ounce)	65	1,574	0.041
Oats for Oatmeal (per cup)	147	2,617	0.056
Dried Prune (one)	2	27	0.074
Banana (one medium)	11	237	0.046
Apple (one medium)	2	70	0.029

## Ginseng:

NOAEL (red korean ginseng) 2,000 mg/kg

LD50 5,000 mg/kg

50 mg/kg increases Dopamine, Serotonin & Norepinephrine

Table 2.

Pharmacokinetic parameters of ginsenoside Rb1 and compound K after single oral administration of Korean Red Ginseng extract

Parameters	Ginsenoside Rb1	Compound K
AUC <sub>t</sub> (ng/mL·h)	102.3±51.0	110.7±51.2
AUC <sub>inf</sub> (ng/mL·h)	307.7±145.6	123.9±57.5
C <sub>max</sub> (ng/mL)	3.94±1.97	8.35±3.19
T <sub>max</sub> (h)	8.70±2.63	12.20±1.81
t <sub>1/2</sub> (h)	58.47±14.28	7.82±1.69

Values are presented as mean±SD.

AUC<sub>t</sub>, area under the plasma concentration-time curve between 0 and 36 h; AUC<sub>inf</sub>, area under the plasma concentration-time curve extrapolated to infinity; C<sub>max</sub>, maximum plasma concentration; T<sub>max</sub>, time to reach C<sub>max</sub>; t<sub>1/2</sub>, elimination half-life.

## Doxylamine:

Doxylamine works by blocking Histamine and Acetylcholine.

Absorption half-life is 0.32 hours

Half-life is 10.8 hours

Volume of distribution 179 L

Clearance rate is 11.46 L/h

Tmax will be reached in 1.67 hours

Toxic dose: 1.8 mg/kg

Alpha-GPC:

Half-life:  $6.82 \pm 6.8$  hours

Tmax:  $3.51 \pm 2.57$  hours

AUC:  $3.43 \text{ ug} \cdot \text{h/mL}$

Molar mass: 257.221 g/mol

Formula  $\text{C}_8\text{H}_{20}\text{NO}_6\text{P}$

Absorption half-life: 1.13 hours

LD50: 10,000 mg/kg

NOAEL: 150 mg/kg

Minimum effective dosage 25 mg

40% of Alpha-GPC is Choline

**Chamomile:**

1.2% mass of Chamomile is Apigenin.

Apigenin Half-life in humans: 12 hours

Apigenin Half-life in mice: 92 hours

Apigenin Tmax:  $0.51 \pm 0.13$  hours

Apigenin Absorption half-life: .068 hours

LD50 (Apigenin) 4837.5 mg/kg

LOAEL (Apigenin) 150 mg/kg

NOAEL (Apigenin) 75 mg/kg

Dosage for sedation 0.6 mg/kg (Apigenin)

**Methylphenidate:**

Volume of distribution:  $1.8 \pm 0.91$  L/kg

Clearance rate:  $0.73 \pm 0.28$  L/h

Half-life: 1.71 hours

T<sub>max</sub>: 2 hours

T<sub>max</sub> (Concerta)  $6.8 \pm 1.8$  hours

Absorption half-life: 1.14 hours

Oral bioavailability: 5%

LD<sub>50</sub> 190 mg/kg

NOAEL 12.5 mg/kg

LDLo 40 mg/kg

60 mg/kg can cause Liver damage

Intraperitoneal doses of 0.25 - 1 mg/kg increase DA by 200% & NA to 400% above baseline

Oral doses of 2 mg/kg increase DA by 200% & NA to 400% above baseline

Doses of 0.3 uM increase DA by 100%

Doses of 1 uM increase DA by ~200%

Estimated minimum detection level 0.0005 mg/L (own data)

Adderall XR and Methylphenidate (racemic) are the same strength (equivalency)

Adderall is twice as powerful as Methylphenidate (racemic)

DexMethylphenidate is 10-fold more potent than Methylphenidate

Concerta is l-methylphenidate and d-methylphenidate racemic, 22% instantly releases then 78% slowly releases.

**B-alanine:**

T<sub>max</sub> = 15 minutes

Half-life = 25 minutes

Absorption half-life = 5.27 minutes

Doses at 1 g usually cause slight tingling sensation

Doses of 2 g the effects are more powerful

**Valproic acid:**

Half-life = 11.55 hours

Volume of distribution = 0.1 L

Clearance rate = 0.006 L/hr

T<sub>max</sub> = 4 hours

Estimated absorption half-life: 1.05 hours

Bioavailability 90%

NOAEL 170 µg/mL

LOAEL 340 µg/mL

**Taurine:**

Half-life = 0.9855 hours

Volume of distribution = 30 L/kg

Clearance rate = 21.1 L/h

T<sub>max</sub> = 1.5 hours

Absorption half-life = 1.1 hours

NOAEL = 1,000 mg/kg

LD<sub>50</sub> = 7,000 mg/kg

Can increase GABA by three-fold

**Rhodiola:**

Half-life 0.93 hours

Clearance rate 1.5 L/h/kg

Volume of distribution 2.02 L/kg

Tmax 2 hours

Estimated absorption half-life 2.2 hours

LD50 3360 mg/kg

NOAEL 50 mg/kg

Doses of 50 mg can delay fatigue

Doses of 250 mg have an effect that last 4 hours

Increases Serotonin 30% above baseline

I.G. administration

Salidroside tmax =  $0.3 \pm 0.1$

Salidroside clearance rate =  $2.54 \pm 0.15$  L/h

Salidroside volume of distribution  $4.46 \pm 1.19$  L/kg

Salidroside bioavailability  $51.97 \pm 2.67\%$

I.V. administration

Salidroside volume of distribution  $0.98 \pm 0.33$  L/kg

Salidroside clearance rate  $1.78 \pm 0.36$  L/h

Salidroside half-life  $0.7 \pm 0.21$  hours

Salidroside half-life 0.38 hours ( $0.693 \cdot v_d / cl$ )

**Phenylethylamine (PEA):**

Tmax 0.25 h

Toxic dose 30 mg/kg



LDLO 203.3±3.3 mg/kg

LD50 226.7±4.4 mg/kg

LD100 258.3±8.8 mg/kg

Half-life 6.9 minutes

Volume of distribution 1858 ml

Clearance rate 186 ml/min

AUC 35.9 ug/ml-min

15

Absorption half-life 16.72 minutes

12.5 mg/kg - 25 mg/kg significantly increase Dopamine in the nucleus accumbens shell

50 mg/kg significantly increases Dopamine in nucleus accumbens shell

Estimated minimum detection level 0.024 mg/kg (own data)

Bioavailability 100%

**Phenylalanine:**

Tmax 36.6 minutes

AUC 7,200 mumol.min/L

Volume of distribution 0.5 L/kg

Clearance rate 0.03 L/h

Absorption half-life 5.1 minutes

half-life 11.55 hours

LD50 5287 mg/kg

NOAEL 500 mg/kg

Amount in foods (per 100 g)

Raw soybeans 1,910 mg

Raw cowpeas 1,390 mg  
Raw lentils 1,380 mg  
Raw peanuts 1,340 mg  
Almonds 1,150 mg  
Raw chickpeas 1,030 mg  
Raw flaxseed 960 mg  
Tahini 940 mg  
English walnuts 710 mg  
Pork 940 mg  
Raw top sirloin 870 mg  
Raw shrimp 860 mg  
Raw chicken thighs 780 mg  
Raw pink salmon 780 mg  
Raw chicken wings 700 mg  
Raw Italian pork sausage 480 mg  
Raw fresh pork 220 mg  
Raw egg white 690 mg  
Raw whole egg 680 mg  
Raw egg yolk 680 mg  
Sheep's milk 280 mg  
Goat's milk 160 mg  
Soy milk 150 mg  
Whole milk 150 mg  
Human milk 50 mg

**Methylphenethylamine:**

Minimum lethal dose  $176.6 \pm 3.3$  mg/kg

LD50  $200 \pm 2.9$  mg/kg

LD100  $221.7 \pm 3.3$  mg/kg

Half-life 4 minutes

Volume of distribution 1188 ml

Clearance rate 203 ml/min

AUC 31.5 ug/ml-min

Tmax 0.25 h

Absorption half-life 42 minutes

**CBD:**

Tmax 1.3 hours

Half-life 2 hours

Metabolites half-life 34 hours

Absorption half-life 0.48 hours

NOAEL 400 mg/kg

Effects can last 6 hours

Can increase Serotonin by 100% at 0.5 mg/kg

**Ashwagandha:**

Withaferin-A Tmax:  $18 \pm 0.12$  minutes

Withaferin-A Half-Life:  $61.2 \pm 9.87$  minutes

Withaferin-A Total clearance:  $290.67 \pm 15.89$  mL/min

Withaferin-A Volume of distribution 0.054 L

Withaferin-A Absorption half-life: 4.4 minutes

Withaferin-A LD50 54 mg/kg

Can increase Testosterone by 40% in doses of ~500 mg

Lowers cortisol by 11-33%

Lowers insomnia by 69%, anxiety by 88%, and depression by 79%

Increases sperm count by 167% (675 mg for 90 days)

Increases semen volume by 53% (675 mg for 90 days)

Increases semen motility by 57% (675 mg for 90 days)

**Cariprazine:**

Volume of distribution 916 L/kg

Clearance rate 5.4 L/h

Oral bioavailability 52%

Tmax 3.9 hours

18

Absorption half-life 0.49 hours

Half-life 117.58 hours

**5-HTP:**

Half-life 1.8 hours

Volume of distribution 0.6 L/kg

Clearance rate 0.23 L/h/kg

Tmax 1.5 hours

Bioavailability 48±15%

Absorption half-life 0.65 hours

**Ginger:**

Half-life 120 minutes

Tmax 65.6±44.4 minutes

Absorption half-life 21.8 minutes

Ibuprofen:

Half-life 1.58 hours

Clearance rate 0.114 L/kg/hr

Volume of distribution 0.26 L/kg

Tmax 1.5 hours

Absorption half-life 0.72 hours

**Nicotine:**

Smoked

Tmax 4 minutes

Bioavailability 90%

Clearance rate 0.78 L/kg/h

Volume of distribution 2.6 L/kg

Half-life 2.31 hours

Absorption half-life 0.5 minutes

Effects usually last 20 minutes

Oral

Tmax 20 minutes

Bioavailability 82%

LD50 0.8 mg/kg

LDLO 0.1 mg/kg

Raises Dopamine levels by 125% above baseline

1.23% of tobacco weight is nicotine

Doses of 0.03 mg/kg injection increase dopamine by 43%

Nicotine per cigarette: 1.91 mg (Marlboro Milds)

Nicotine per cigarette: 2.56 mg (Camel Menthol)

**L-Arginine:**

Oral bioavailability  $68 \pm 9$  (51-87)%

Volume of distribution 24 L/kg

Clearance rate 44 L/h

Half-life 1.27 hours

Tmax  $0.7 \pm 0.1$  hours

Absorption half-life 14 minutes

LD50 5.1 g/kg

Increases GABA by 65%

**Kava:**

Kavain Injection:

Volume of distribution = 2.7 L/kg

Clearance rate = 89 mL/min

Half-life = 31.2 minutes

Tmax = 10 minutes

Absorption half-life = 2.5 minutes

Kavain Oral:

Half-life = 1.3 hours

Tmax = .88 hours

Absorption half-life = 20 minutes

Volume of distribution = 0.085 L/kg

Bioavailability = 50%

Piper Methysticum NOAEL = 24 mg/kg

500 mg/kg results in liver damage

Minimum effective dosage: 70 mg

Increases Dopamine by 25%-50%

**Adderall:**

dextroamphetamine:

Volume of distribution 195 L

Clearance rate 17 L

Absorption half-life: 0.8 hours

Tmax 3 hours

Half-life 7.95

amphetamine:

Clearance rate 0.7 L/kg/h

Volume of distribution 4 L/kg

Bioavailability 75%

Tmax 3 hours (adderall XR = 7 hours)

Half-life 3.960841031771116053812754979761

Absorption half-life 1.22 hours

Raises dopamine by 3,000% (at 2 mg/kg)

Raises dopamine by 421% (at 1 mg/kg)

Raises Serotonin by 165% (at 1 mg/kg)

Raises Serotonin by 200% (at 2 mg/kg)

D-amphetamine:Amphetamine ratio = 3:1 = Adderall

**Methylenedioxymethamphetamine (MDMA):**

t<sub>max</sub>: 1.9 ± 0.4

Clearance rate: 0.48 ± 0.13 L/kg

Volume of distribution: 4.9 ± 2.6 L/kg

Half-life: 7 hours

Absorption half-life: 0.45 hours

Increases plasma oxytocin to 83.7 pg/ml at 1.5 mg/kg (baseline = 15 pg/ml [500% above baseline])

Increases dopamine by 500% at 7.5 mg/kg, 235% for 3 mg/kg & 1.5 mg/kg failed to alter synaptic DA

Increases serotonin by 3,000% at 7.5 mg/kg & 500% at 1.5 mg/kg & 911% at 3 mg/kg

Full recovery from single dose of 15 mg/kg can take 7 to 21 days (20-40% reduction in 5-HTT-IR)

Full recovery in sleep at 15 mg/kg (single dose) takes 180 days

1.5 mg/kg increases loving and friendly

0.75 mg/kg increases loneliness

**Topiramate:**

Increases GABA by 10-600% (25 mg to 1 g) over basal values

Gabapentin:

Oral clearance 5.24±1.32 L/hr

Oral volume of distribution 49.28±15.98 L/kg (58±6 L/kg for injection)

Oral T<sub>max</sub> 3.17±0.8 hours

Absorption half-life 0.99 hours

Half-life 6.5187582171744474900918318598204 hours

Oral bioavailability 60%



Increases GABA concentration by 55.7% ( 6.9 91 %) -

TDLo 2.86 mg/kg

DexMethylphenidate:

Oral:

Volume of distribution  $2.65 \pm 1.11$  L/kg

Clearance rate  $0.4 \pm 0.12$  L/hr/kg

Tmax 1.5 hours

Absorption half-life 0.38 hours

Half-life 4.6 hours

Oral bioavailability 23%

Oral dose 0.25 mg/kg increase dopamine by 50%

**Lisdexamferamine:**

Tmax 1 hour

Half-life 0.47 hours

Absorption half-life 1.08 hours

41.5% is converted to dextroamphetamine

**Lamotrigine:**

Oral:

Volume of distribution 1.36 L

Clearance rate 0.0762 L/h

Half-life 12.37 hours

Tmax 1.3 hours

Tmax (XR) 3 hours

Absorption half-life 0.22 hours

LD50 205 mg/kg

TDLO 3.1 mg/kg

**Oxytocin:**

Volume of distribution 0.17 L

Clearance rate 0.02 L/min

Half-life 5.9 minutes

**Dopamine:**

Volume of distribution 5.2 L

Clearance rate 1.9 L/min

Half-life 1.9 minutes

**Prolactin:**

Volume of distribution 1.3 L/h

Clearance rate 0.038 L/min

Half-life 23.7 minutes

**Azithromycin:**

Volume of distribution: 34.5 L/kg

Clearance rate: 0.85 L/kg/h

Half-life: 28.13 hours

Oral bioavailability: 37%

Minimum Inhibitory Concentration: 0.12 mg/L

i.m. bioavailability 92.2%

**Alprazolam:**

Oral volume of distribution 0.84 L/kg

Oral clearance rate 0.0534 L/hour

Oral half-life 10.9 hours

Oral bioavailability 92%

Oral t<sub>max</sub> 3 hours (1-12 hours)

Oral absorption half-life 0.71 hours

IV volume of distribution 0.72 L/kg

IV clearance rate 0.0444 L/hour

IV half-life 11.24 hours

3 mg increased prolactin by 100% after 2-3 hours of dosing

10 fold more potent than diazepam

clonazepam is 2.5 fold more potent than alprazolam

Increases GABA<sub>A</sub> by 200±30%

**B-endorphins:**

Volume of distribution 178 mL/kg

Clearance rate 3.2 mL/min/kg

Half-life 38.6 minutes

**Piracetam:**

Oral volume of distribution 0.6 L/kg

(?) Apparent total body clearance 5.16 L/h

T<sub>max</sub> 1.5 hours

Absorption half-life 0.37 hours

Half-life 5 hours

Increases dopamine by 21% (100 mg/kg)

Decreases serotonin by 19% (100 mg/kg)

Phenylpiracetam is 60-fold more potent than piracetam

**LSD:**

Volume of distribution 0.676 L/kg

Clearance rate 0.18 L/kg/h

Tmax 1.5 hours

Half-life 2.6 hours

Absorption half-life 0.51 hours

Average trip lasts  $8.2 \pm 2.1$  hours

LD50 0.3 mg/kg

**Phenibut:**

Half-life: 5.3 hours

Tmax: 4.5 hours

Absorption half-life: 2 hours

Minimum dose for withdrawal: 15 mg/kg

LD50: 700 mg/kg

Hypotension: 14 mg/kg

Nootropic affect: 20 mg/kg

Sedating affect: 50 mg/kg

Steatophepatitis: 100 mg/kg

**Vitamin D:**

25(OH) Half-life 15 days in circulation, 8 weeks in adipose tissue

Tmax 5 days

Absorption half-life 1.3 days

NOAEL 100 ng/ml OR 10,000 IU for 50 kg b.w. person

Sun exposure for 30 minutes is equivalent to 10,000 IU

100 IU = 1 ng/ml for 50 kg b.w.

Body mass \* 2 = IU per ng/ml

1 mcg = 40 IU

100 IU per minute of sun exposure for Vitamin D3

**Dextromethorphan:**

Tmax 2.86 hours

Half-life 2 hours

Absorption half-life 1.96 hours

Volume of distribution 5.1 L/kg

ESTIMATED clearance rate 1.77 L/kg/hour

**THC LD50 = 40 mg/kg**

**THC increases dopamine by 50% at 1 mg/kg**

**Cannabinoid 1 receptors start to return to normal after 2 days, and reach baseline within 4 weeks**

**THC:**

Smoked

Half-life 30 minutes

Tmax 3±1 (3-10)

Absorption half-life 0.5 minutes

Bioavailability 40%

Oral

Half-life 2 hours

Tmax 2.6 hour

Absorption half-life 1.6 hours

Bioavailability 15%

**THCA:**

Half-life  $3.4 \pm 0.9$  hours

Tmax 15 minutes

Absorption half-life 2.3 minutes

0.1 mg/kg increases anxiety

50 ug/kg smoked causes altered visual, auditory, and time perception

200 ug/kg causes psychosis

**Valerian root:**

Tmax 1 hour

Half-life  $1.1 \pm 0.6$  hours

Absorption half-life 0.5 hours

**Setraline:**

Half-life 26 hours

Absorption half-life 1.3 hours

Tmax 6 hours

Can increase Serotonin by 400%

**Capsaicin:**

Half-life 25 minutes

Tmax 45 minutes

LD50 97.2 mg/kg

NOAEL 45 mg/kg

After 105 minutes, no capsaicin was detected in blood.

Scoville units =  $\text{mg/g} \times 16,000$  ( $\text{ppm} \times 16$ )

Caroline Reaper is  $81 \pm 4$  mg/g Capsaicin [1,296,000 Scoville units] ( $32 \pm 2$  mg/g dihydrocapsaicin)

Ghost pepper is 25.8 mg/g Capsaicin [412,800 Scoville Units] (5.07 dihydrocapsaicin)

**Citric Acid:**

Tmax: 0.8 hours

Half-life: 2.3 hours

Absorption half-life: 0.21 hours

**Fentanyl:**

Half-life: 1.98 hours

Volume of distribution: 3.6 L/kg

Clearance rate: 1.26 L/kg/h

Tmax: 39.8 ± 17.4 minutes

Absorption half-life: 10 minutes

LD50: 1 mg/kg

LdLo: 0.028 mg/kg

Dose for analgesia 1 ng/ml (0.0036 mg/kg) to 2 ng/ml

Dose for anesthesia is 10 ng/ml (0.036 mg/kg) and 20 ng/ml

**Morphine:**

Half-life: 2.86 hours

Volume of distribution: 5.2 L/kg

Clearance rate: 1.26 L/kg/hour

Tmax: 1.1 +/- 0.2 hours

Absorption half-life: 0.3 hours (18 minutes)

**Heroin:**

Half-life: 2.95 minutes

Clearance rate: 30.8 +/- 2.1 ml/kg/min

Volume of distribution: 131 ml/kg

Tmax: 1.5 minutes

Absorption half-life: 0.475 minutes

**Lavender:**

Tmax (linalool): 1 hour

Half-life (linalool): 2 hours

Absorption half-life (linalool): 0.315 hours (~19 minutes)

**Theobromine:**

Half-life 6.6 hours (17.5 hours in dogs)

Clearance rate: 0.065 L/kg/h  $\pm$  0.02 K/kg/h

Volume of distribution: 0.62 L/kg  $\pm$  0.13 L/kg

Tmax 2 hours (10 hours in dogs)

Absorption half-life: 0.5 hours (3.5 hours in dogs)

LD50: 1,000 mg/kg (300 mg/kg for dogs, 200 mg/kg cats, 950 mg/kg rats)

Toxic dose in dogs: 100 mg/kg

10-fold less potent than caffeine (methyltheobromine)

Theobromine concentration in milk chocolate 1 mg/g (10 mg/kg for dark chocolate)

**Formula(s):**

Tmax:  $(\ln(k_a) - \ln(k_e)) / (k_a - k_e)$  OR  $(\ln(k_a/k_e)) / (k_a - k_e)$

Half-life:  $\text{dose}(e^{(-k_e \times \text{timesincetmax})})$  for absorption put dose minus formula

constant elimination / absorption:  $\ln(2) / (t_{1/2})$

every mg/kg of caffeine increases dopamine by 15%

mg/kg times 10 = amount of adenosine blocked from caffeine, maximum 50%

mg/kg subtract 1 then times by 12.5 is epinephrine released from caffeine, maximum = 100%

mg/kg times 1,000 = amount of dopamine released from nicotine



mg/kg times 10 = amount of glutamate increased from caffeine, maximum 50%

mg/kg times 7 = amount of serotonin released from caffeine, maximum 30%

Caffeine can deplete epinephrine by 25% at 100 mg/kg long-term

Dexmethylphenidate 10 times potent than LevoMethylphenidate

Heroin 2,000 times mg/kg for dopamine release

30 times mg/kg for dopamine released from cocaine

Morphine 100 times mg/kg for dopamine release

mg/kg times 200 = dopamine released from DexMethylphenidate, DA times 2 for

Norepinephrine, maximum = 200% and 400% respectively

mg/kg times 50 for dopamine released from THC, maximum = 50%

g/kg times 100 = dopamine released from ethanol, maximum = 100%

mg/kg times 500 = dopamine released from Methamphetamine, maximum = 8,000%

mg/kg times 2,000 = dopamine released from Dextroamphetamine, maximum = 6,000%

mg/kg times 100 = dopamine released from MDMA, maximum = 500%, only effective after 1.5 mg/kg

mg/kg times 400 = serotonin and oxytocin released from MDMA, maximum = 3,000%, 500% respectively

(hours awake - 6) / 4 + 4.5 = adenosine from being awake

Adenosine starts to increase after 6 hours of being awake

10% brain cell loss per day from sleep deprivation

Definitions:

ka = constant absorption

ke = constant elimination

t<sub>1/2</sub> = half-life

**List of dopamine activities:**

Music: 6%-9%

14°C/57.2°F Cold Showers: 250% (While increasing norepinephrine by 530%) (in plasma)

Water submersion: NA% (while increasing b-endorphins 20 times above baseline)

Stress: NA% (while increasing cortisol by 500%)

Vigorous Exercise: 600% (in plasma) (while increasing b-endorphins by 400% in 30-60 seconds, moderate exercise for 1 hour doesn't increase b-endorphins, 10 fold increase in epinephrine)

Skydiving&alike activity: NA% (oxytocin 200%, epinephrine 50 fold, norepinephrine 20 fold)

Nicotine: 125% (43% at 0.03 mg/kg injection & 25% at 0.025 mg/kg & 50% at 0.05 mg/kg)

L-Theanine: 300% (in the interstitium)

Cocaine: 350% @ 1.5 mg/kg, 500% @ 5 mg/kg & 1,300% @ 20 mg/kg (while increasing

Acetylcholine by 261%, cortisol by 73%, NA by 150%) (depletes Dopamine for 60 days)

Amphetamine: 3,000% (Serotonin: 300% at 2 mg/kg, Norepinephrine 350% @ 2.5 mg/kg)

Caffeine (10 mg/kg): 100%-150% (while increasing Glutamate by 50%, and Serotonin

by 20% at 4 mg/L [maximum 30%], epinephrine 100% [can deplete by 25%]) (in the Nucleus Accumbens)

Meditation: 65% (in Indigenous) (while increasing GABA by 27%)

Social Connections (eg: petting a dog, possitive social interactions, hugging): 31% (while

lowering cortisol by 31%, increasing oxytocin by 5-10% for strangers 50% for strangers found attractive and 100% for family members eg pets etc, and increasing Serotonin by 28%)

Food: 45%-50%

Sex: 100% (also increases other hormones such as oxytocin by 20%-360%-500% [peak 20 min], serotonin by

250%, prolactin by up to 300% [peak 20 min], b-endorphins by 86-fold, vassopresin, phenylethylamine, nitric

oxide, Glutamate by 300%)

Heroin: 200% (500%-1,000% when combined with Cocaine) (endorphins 12-fold)

Ethanol: 100% (while increasing meta-enkephalin by 20%, b-endorphins by 20%)

MDMA: (500% @ 7.5 mg/kg) (while increasing serotonin by 3,000% @ 7.5 mg/kg, Cortisol by 800% & (oxytocin by 500% at 1.5 mg/kg))

Video Games: 75%-100% (also depletes Dopamine in the D2 receptor by 10.5%)

Methamphetamine: 6,000% (can penetrate neurons causing permanent cell damage, while increasing Glutamate by 500%)

Methylphenidate (at 2 mg/kg oral & 0.25-1 mg/kg intraperitoneal): 200% (while increasing norepinephrine by 400%)

Tyrosine: 120%

Phencyclidine: 180%

Morphine: 110% (while increasing b-endorphins by 12-fold)

$\beta$ -Phenylethylamine (PEA) [at 100uM (~22.5 mg/kg)]: 157 $\pm$ 12% (in DAT-1)

Hyperzine A: 129% (in Cortex)

Fish oil: 40% (in Frontal Cortex)

Resveratrol: 53%

Kava: 25%-50% (for 8 hours)

Quinpirole: 50%

Corticosterone: 210%

Mephedrone: 500% (while increasing Serotonin by 950%)

THC (injection): 50% at 1 mg/kg (25% at 0.5 mg/kg in the accumbens) (can take 2-28 days for cannabinoids to reach baseline)

Methylenedioxypyrovalerone (bath salts): 300% (while increasing serotonin by 120%)

Dextroamphetamine: 6,000%

Gambling: 54-63% (D3 Receptor)

Aggression: 20-40% (while decreasing serotonin by 20%)

Sleep Deprivation: 30%

Familiar Cuddle: 50% (oxytocin: 17.3-1632.3% Mean 321.3% [Fake dog owner condition: 83.3% (15.05-271.4%)] [Mechanical hand condition: 89.09% (22.8-314.1%)])

Disulfiram: 145%