

# **Antidepressants:** An heterogeneous pharmacological class

#### Antidepressant Blockade of Monoamine Transporters and Receptors in the Human Brain\*

Anti- depressant	Serotonin Trans- porter Inhibition	Norepi- nephrine Trans- porter Inhibition	of Sero- tonin/ Norepi- nephrine Uptake Blockade	Dopa- mine Trans- porter Inhibition	α <sub>1</sub> - Adreno- receptor Blockade	Dopamine D <sub>2</sub> Re- ceptor Blockade	Hista- mine H <sub>1</sub> Re- ceptor Blockade	Muscarinic Receptor Blockade	Serotonin 5-HT2A Receptor Blockade
Paroxetine	800	2.5	320	0.2	0.029	0.0031	0.0045	0.93	0.0053
Fluoxetine	120	0.41	300	0.028	0.017	0.0083	0.016	0.05	0.48
Sertraline	340	0.24	1400	4	0.27	0.0094	0.0041	0.16	0.01
Fluvoxamine	45	0.077	580	0.011	0.013	0	0.00092	0.0042	0.018
Citalopram	90	0.025	3500	0.0036	0.053	0	0.21	0.045	0.042
Compramine	360	2.7	140	0.045	2.6	0.53	3.2	2.7	3.7
Imipramine	70	2.7	27	0.012	1.1	0.05	9.1	1.1	1.2
Amitriptyline	23	2.9	8	0.031	3.7	0.1	91	5.6	3.4
Desipramine	5.7	120	0.05	0.031	0.77	0.0303	0.91	0.5	0.36
Amoxapine	1.7	6.2	0.27	0.023	2	5.6	4	0.1	97
Doxepin	1.5	3.4	0.43	0.0082	4.2	0.042	420	1.2	4
Venlafavine	11	0.094	120	0.011	D G	0	0	0	O
Reboxetine	1.7	14	0.12		0.0084	0.025	0.32	0.015	0.016
Nefazodone	0.5	0.28	2	0.28	3.9	0.11	4.7	0.0091	30
Mirtazapine	0.001	0.021	0.05	0.001	0.02	0.01	700	0.15	6.1
Buptopion	0.011	0.0019	5.8	0.19	0.022	0	0.015	0.0021	0.0011

Insifesculet al 2003

## What the Science Says About the Effectiveness of St. John's Wort for Depression

The results of studies on the effectiveness of St. John's wort for depression are mixed.

- · In a 12-week, 2011 clinical trial with 73 participants, neither St. John's wort nor a standard antidepressant medication called citalopram, a selective serotonin reuptake inhibitor (SSRI), decreased symptoms of minor depression better than a placebo. (NCCIH and NIMH)
- · In a 26-week clinical trial with 124 participants, St. John's wort, a standard antidepressant (sertraline, an SSRI), and a placebo were similarly effective in treating major depression of moderate severity (NCCIH and NIMH 2012)
- A 2008 review of 29 international studies suggested that St. John's wort may be better than a placebo and as effective as different standard prescription antidepressants for major depression of mild to moderate severity. St. John's wort also appeared to have fewer side effects than standard antidepressants. The studies conducted in German-speaking countries—where St. John's wort has a long history of use by medical professionals—reported more positive results than those done in other countries, including the United States.
- · St. John's wort was no more effective than placebo in treating major depression of moderate severity, an NCCIH- and NIMH-funded study of 340 participants reported in 2002.

### Taking St. John's wort can weaken many prescription medicines, such as:

Antidepressants Birth control pills, Cyclosporine, used to prevent the body from rejecting transplanted organs Digoxin, a heart medication, Oxycodone, a pain medicine, Some HIV drugs, including indinavir Some cancer medications, including irinotecan, Warfarin, an anticoagulant (blood thinner).

Other side effects of St. John's wort are usually minor and uncommon. They may include upset stomach, dry mouth, headache, fatique, dizziness, confusion, sexual dysfunction, or sensitivity to sunlight. Also, St. John's wort is a stimulant and may worsen feelings of anxiety in some people.

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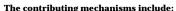
# St. John's wort\* and depression

- · St. John's wort (Hypericum perforatum), a plant that grows in the wild, has been used for centuries for mental health conditions. It's (widely) prescribed for depression in Europe.
- · St. John's wort is sold as a dietary supplement in the United States, where the standards for selling supplements are less strict than the standards for prescription or over-the-counter drugs.

(the National Center for Complementary and Integrative Health (NCCIH))







- inhibition of the reuptake of serotonin (5-HT), dopamine (DA), norepinephrine (NE) in the synaptic cleft (of interconnecting neurons)
- · binding to the GABA-A and GABA-B receptors thereby inhibiting the binding of GABA ligands,
- increasing the density of 5-HT2 receptors in the frontal cortex of the brain
- inhibition of both monamine oxidase (MAO) and catechol-O-methyltransferase (COMT) enzymes in the brain thereby allowing more DA to be converted to NE.



(\*: Sint-janskruid) 38 Anthony J. Busti, MD, PharmD, FNLA, FAHA, 2015

## Other examples of Natural Remedies for Depression







#### Omega-3 Fatty Acids:

a type of fat needed for normal brain function. Our bodies cannot make omega-3 fatty acids so they must be obtained through diet.

Studies have linked depression with low dietary intake of omega-3 fatty acids and have also found that countries with higher fish consumption, such as Japan, have a lower rate of depression. Preliminary studies suggest that omega-3s (DHA and EPA) together with antidepressants may be more effective than antidepressants alone. Cold water fish such as salmon, sardines, and anchovies are the richest food source of

omega-3 fatty acids

### Folic Acid:

Folate, is a B vitamin found in green leafy vegetables, fruit, beans, and fortified grains. It is one of the more prevalent vitamin deficiencies due to poor diet and also because of medication use (such as aspirin and oral contraceptives). Preliminary research suggests that people with depression who also have low folate levels may not respond as well to antidepressants, and taking folic acid in supplement form may improve the effectiveness of antidepressants.













