



# Medications and Autism

As no exact biological cause of Autism – if indeed there is one – has yet been identified, there is no medication which can cure or treat it. The main forms of Autism treatment are behavioural, educational and psycho-social interventions tailored to each child. Medications, when prescribed to a child with Autism, aim to manage behaviours or co-morbidities (any conditions that your child has because of or alongside their Autism) so that your child's individualised intervention is more effective, or at least they are more receptive to it. Certain co-morbidities are more likely to occur in people with Autism, for example anxiety, obsessive compulsive disorder and epilepsy.



An example of prescribing medications for a child with Autism could be if he/she suffers from Attention Deficit Hyperactivity Disorder. To help deal with this specific condition, but not with the Autism per se, they may be prescribed Ritalin (methylphenidate). The Ritalin aims to treat the ADHD so that the child is less affected by this and hence more alert and open to therapy received as part of the individualised intervention for their Autism.

<http://www.medindia.net/patients/images/child-health2.jpg>

More uncommon is the situation in which non-medical intervention has failed to show any improvement. If this occurs for your child, your clinician may advise medical intervention.

No two children are the same, so it follows that no medication can be guaranteed to have the same effect, or side effects, on every child who uses it. The best way to go about deciding whether or not your child will benefit from pharmacotherapy is by talking to your paediatrician. He/she should then work with you and your child to identify your child's medical, developmental and psycho-social needs. Keep in mind that your child's needs will change as they grow – a child who may have once been able to function quite well without medication may benefit from it later on in life due to life changes brought on by things like puberty. Or a child who once seemed dependent on a certain medication may be weaned off it later in life, or changed to a different medication. It is important to have an understanding, open relationship between your clinician, your child and yourself, to identify needs for medication as they arise and make them fit with other therapies and interventions tailored to your child.

## SELECTIVE SEROTONIN REUPTAKE INHIBITOR (TYPE OF ANTIDEPRESSANT)



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Antidepressants are drugs which act on neurotransmitters or neurotransmitter pathways. Neurotransmitters are chemicals which cells in the nervous system use to communicate with each other.

The main antidepressant prescribed for Autistic children with conditions such as obsessive compulsive disorder and depression is a Selective Serotonin Reuptake Inhibitor (SSRI)

### What is Serotonin?

Serotonin (also known as 5-hydroxytryptamine) is a neurotransmitter. Apart from functioning in the gastrointestinal system, serotonin functions in the central nervous system to regulate things like mood, appetite and sleep. It also has a role in

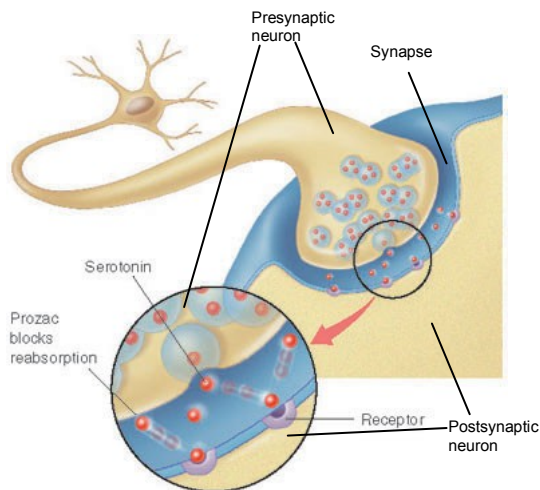
tasks like learning. Serotonin needs to be released into the gap (synapse) between two neural cells (neurons) by a "giving" (presynaptic) neuron and taken up by a "receiving" (postsynaptic) neuron in order to have an effect. Serotonin is taken up by the serotonin receptor, which is located in a postsynaptic neuron's membrane. The serotonin receptor first binds a sodium ion, then a serotonin molecule, and then a chloride ion. The transporter changes its configuration to allow the serotonin to enter the neuron. Then, a potassium ion binds to the transporter, and the transporter resumes its original configuration, ready to bind another serotonin molecule. Normally only about 10% of the serotonin released by a presynaptic neuron will be taken up by the postsynaptic neuron – the remainder will be reabsorbed by the presynaptic neuron in a process known as reuptake.

### How do SSRIs work?

An SSRI inhibits the reuptake of the remaining 90% of the serotonin that was released by a presynaptic cell. This means that more serotonin stays in the synapse for longer and hence more is available to be taken up by a postsynaptic neuron's serotonin receptors. This prolongs the effects of serotonin. For example, one of the effects of serotonin is to make people feel happy (it's known as a "pleasure chemical"), so SSRIs can be prescribed for people who have depression.

### What else is it known/sold as?

Citalopram (brand name: Celexa), fluoxetine (brand name: Prozac), paroxetine (brand name: Paxil) and sertraline (brand name: Zoloft).



### Why would my child be prescribed an SSRI?

SSRIs can be prescribed to treat depression, obsessive compulsive disorder and panic disorder. These are neurological conditions believed to be caused at least partially by low amounts of serotonin. If your child has one of these conditions they may be prescribed SSRIs to help alleviate them so they are less affected by them and ideally are more receptive to their individualised Autism intervention.

The effect of an SSRI (Prozac) on serotonin reuptake (<http://txtwriter.com/Backgrounders/Drugaddiction/receptors.jpg>)

### Are there any side effects?

There are different types of serotonin receptors, each of which has a different effect. If they stimulate 5-HT1 receptors, antidepressant and anxiolytic effects are produced. But if they stimulate 5-HT2 receptors they can cause anxiety and insomnia, and if they stimulate 5-HT3 receptors they can cause nausea and headache. At the extreme, some people can become more agitated, depressed and anxious after starting treatment, and this may lead to suicidal thoughts or idealisation. If you notice your child showing any of these symptoms, notify your clinician immediately. Also, serotonin syndrome (or serotonin toxicity) is caused by an excess of serotonin, and can occur if two or more serotonergic drugs (e.g. serotonin) are taken alongside each other. If you notice any severe side effects in your child following the administration of any medication, immediately take them to hospital.

### Miscellaneous information

For some time SSRIs were prescribed to some children with Autism in the belief that they had some benefits in treating the child's actual Autism. However a study conducted in September 2010 which showed that there is "no evidence to support the use of SSRIs to treat Autism in children" and "limited... not yet sufficiently robust [evidence] to suggest effectiveness of SSRIs in adults with Autism". (Williams K et. al, *Selective serotonin reuptake inhibitors (SSRIs) for Autism spectrum disorders (ASD) (Review)*, 2010).

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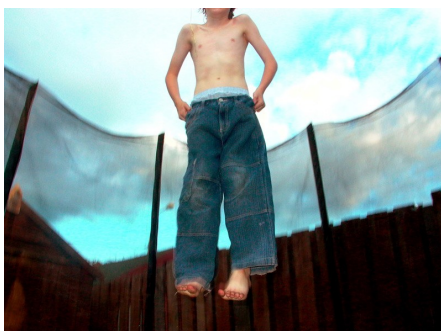
## STIMULANT MEDICATIONS

Stimulants (also known as psychostimulants) are substances which enhance mental and/or physical function by working on the peripheral and/or central nervous system. The stimulants outlined below all act on the central nervous system through currently unknown mechanisms.

### Methylphenidate

#### What else is it known/sold as?

Ritalin, Attenta.



#### How does methylphenidate work?

The mode of action of methylphenidate is not yet fully known, however it is believed to increase dopamine levels within the brain (which is part of the central nervous system). Dopamine is a neurotransmitter which is involved in our pleasure and learning pathways.

#### Why would my child be prescribed methylphenidate?

If your child has Attention Deficit Hyperactivity Disorder (ADHD) alongside their Autism, they may be prescribed methylphenidate to help increase dopamine levels in the brain to help them concentrate better on tasks and be more alert.

[http://www.filemagazine.com/thecollection/archives/images/child\\_on\\_trampoline.jpg](http://www.filemagazine.com/thecollection/archives/images/child_on_trampoline.jpg)

### **Are there any side effects?**

There can be some side effects however they are usually uncommon and not too severe. They can include things like anxiety, nervousness, insomnia and confusion. If you notice any serious side effects in your child, see your clinician immediately.

## **Dextroamphetamine**

### **What else is it known/sold as?**

Dexedrine, Dextrostat, Dexedrine Spansule.

### **How does dextroamphetamine work?**

As with methylphenidate, the mode of action of dextroamphetamine is not yet fully known but is believed to involve the central nervous system.

### **Why would my child be prescribed dextroamphetamine?**

The indications (reasons for prescribing) dextroamphetamine are usually similar to those for methylphenidate, but recent studies are showing that dextroamphetamine is superior to methylphenidate in treating the core symptoms of ADHD. More research is needed before this is firmly established but doctors are starting to prescribe this long-acting amphetamine preparation more commonly for children and adults with ADHD.

### **Are there any side effects?**

Potential side effects of dextroamphetamine are similar to those of methylphenidate.

## **Pemoline**

### **What else is it known/sold as?**

Cylert.

### **How does pemoline work?**

As with methylphenidate and dextroamphetamine, the mode of action of pemoline is not yet fully known but is believed to involve the central nervous system.

### **Why would my child be prescribed pemoline?**

The indications (reasons for prescribing) pemoline are usually similar to those for methylphenidate and dextroamphetamine – that is to say, ADHD and narcolepsy.

### **Are there any side effects?**

Some patients who have been prescribed pemoline have reported liver problems, so regular liver function tests are usually ordered for patients on pemoline.

## **Miscellaneous information**

Pemoline is an extract of methylphenidate. Pemoline also has few reported cases of dependence.

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<http://www2.hiren.info/desktopwallpapers/thumb/loveable-angel-baby-girl.jpg>

## **ANTIPSYCHOTICS**

Antipsychotics are drugs which are designed to treat psychiatric conditions. They work by binding to receptors for different neurotransmitters in a part of the brain called the basal ganglia. Sometimes inappropriate amounts of neurotransmitters in this part of the brain can cause psychiatric conditions such as schizophrenia or symptoms such as hallucinations. Typical antipsychotics are good at stopping certain symptoms (e.g. hallucinations, delusions, disordered thought) but they have several significant side effects such as Parkinsonism and are not very effective in improving things like loss of drive and withdrawal. Atypical antipsychotics are a newer type of antipsychotic that work in the same part of the brain in similar sorts of ways to typical antipsychotics, but have fewer side effects (particularly extrapyramidal side effects). When clinicians elect to prescribe antipsychotics today they usually elect to prescribe atypical antipsychotics.

## **Risperidone (atypical antipsychotic most commonly prescribed for children with Autism)**

### **What else is it known/sold as?**

Risperdal.

### How does Risperidone work?

See above under "ANTIPSYCHOTICS" heading.

### Why would my child be prescribed an atypical antipsychotic?

These can be prescribed for children who have mood or behavioural disturbances, which are usually characterised by irritability, aggression and agitation. Risperidone has so far been found to be the most effective atypical antipsychotic for easing irritability in children with Autism.

### Are there any side effects?

Risperidone can cause insomnia, agitation, dizziness, orthostatic hypotension, and tachycardia. It can in some cases cause extrapyramidal side effects, such as akinesia (inability to initiate movement) and pseudoparkinsonism (includes tremor, hypokinesia, rigidity and postural instability).



<http://thoughtsonfilms.files.wordpress.com/2009/02/time.jpg>

### MEDICATION OF THE FUTURE? NMDA RECEPTOR ANTAGONISTS

The N-methyl-D-aspartic acid (NMDA) receptor is a receptor which binds the neurotransmitter glutamate. It is important in memory formation and synaptic plasticity (the ability of the brain to change in response to how it is used). A 2010 research paper has suggested that lack of function of the GABAergic system and glutamate toxicity (GABA and glutamate are inhibitor and excitatory neurotransmitters in the brain) might have some role to play in Autism. Following from this, the paper suggests that if something can bind to a substance called glycine to stop it working, then glycine can't bind to the NMDA glutamate receptor, and thus there will be minimisation of glutamate toxicity and therefore improvement in the core symptoms of Autism. The paper ended stating that "evidences

[from existing studies and papers] lead to this hypothesis that glycine site antagonists can be tested as a new strategy for the management of Autism. So, it is worthwhile conducting preliminary culture medium or clinical trials on animal models such as proper knock-out mice to investigate its possible therapeutic role. Of course, before conducting it, supporting evidence for its safety and efficacy, and the experimental and clinical evidence for the superiority of the NMDA glycine site antagonists over the agents acting at the extra-glycine NMDA receptor regulatory sites should be provided." (Ghanizadeh A., *Targeting of Glycine Site on NMDA Receptor as a Possible New Strategy for Autism Treatment*, 2010). This shows that there is ongoing interest and research being done to devise novel medical treatments for Autism.

Above all, it is important to remember that "pills don't give skills" (Jacobson: *Psychiatric Secrets*, 2nd ed., 2001). As summarised so well by Dr. Dodson in the cited book: "Medication levels the neurologic playing field so that individuals [with neurologic conditions] can have an equal chance at life and begin to do the remedial work necessary to rebuild their lives, work, and relationships."

## RESOURCES

Williams K, Wheeler DM, Silove N, Hazell P. Selective serotonin reuptake inhibitors (SSRIs) for autism spectrum disorders (ASD). Cochrane Database of Systematic Reviews 2010, Issue 8. Art. No.: CD004677. DOI: 10.1002/14651858.CD004677.pub2.

Ghanizadeh, A. (2010, December 20). Targeting of Glycine Site on NMDA Receptor as a Possible New Strategy for Autism Treatment. *Neurochem Res.* doi:10.1007/s11064-010-0381-2

A review of the research to identify the most effective models of practice in early intervention for children with autism spectrum disorders. (2006, July). In Australian Government Department of Health and Ageing. Retrieved February 21, 2011, from <http://www.health.gov.au/internet/main/publishing.nsf/Content/mental-child-autrev-toc~mental-child-autrev-exec~mental-child-autrev-exec-sum>

Bennetto, L., & Rogers, S. (2001). *Jacobson: Psychiatric Secrets* (2ndnd ed.). Philadelphia, PA: Hanley and Belfus. Retrieved February 19, 2011, from /books/linkTo?type=bookPage&isbn=1-56053-418-4&eid=4-u1.0-B1-56053-418-4.X5001-8

Therapeutic Guidelines. (2010, November). In ETG Complete. Retrieved February 19, 2011, from <http://etg.tg.com.au.ezproxy.uws.edu.au/ip/>

Posey, D. J., Stigler, K. A., Erickson, C. A., & McDougle, C. J. (2008, January). Antipsychotics in the treatment of autism [Electronic version]. *Science in medicine*, 18.

Nickels, K. C., Katusic, S. K., Colligan, R. C., Weaver, A. L., Voigt, R. G., & Barbaresi, W. J. (2009, April 1). Stimulant Medication Treatment of Target Behaviors in Children with Autism: A Population-Based Study [Electronic version]. *J Dev Behav Pediatrics*.

Thank you to the parents who shared the experiences and scenarios referred to in this document.