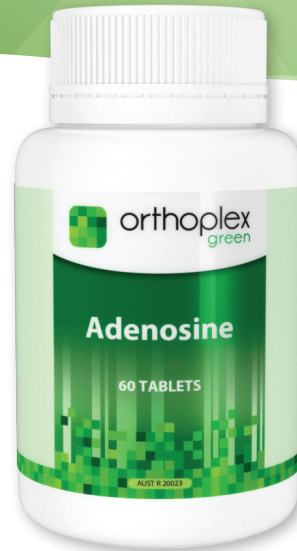


# Adenosine

Cellular Energy Support

**Provides 100mg of Adenosine per tablet.**

**Orthoplex Green Adenosine** is a unique component for cellular energy metabolism and neurobiochemical support.



- Gluten Free
- Dairy Free
- Egg Free
- Soy Protein Free
- Vegan
- Vegetarian

AUST R 20023

**Pack Size:** 60 tablets

**Adult Dose:** Take 1 tablet twice daily dissolved sublingually, or as recommended by your registered healthcare practitioner.

**Storage:** Store below 30°C in a cool, dry place, away from direct sunlight.



Full disclosure of excipients in every formulation

## Indications

- Adenosine is an inhibitory neuromodulator in the brain
- Adenosine is a component of ATP which regulates cellular metabolism

## Excipients

Calcium hydrogen phosphate dihydrate, microcrystalline cellulose, crospovidone, magnesium stearate, povidone, silicon dioxide, sorbitol.

## Warnings

*If symptoms persist consult your healthcare practitioner.*

## Contraindications

None

Pregnancy & lactation - contact Technical Support on 1800 077 113

*Information taken from Natural Medicines Database and accurate as of September 2019*

## Each Tablet Contains

Adenosine	100mg
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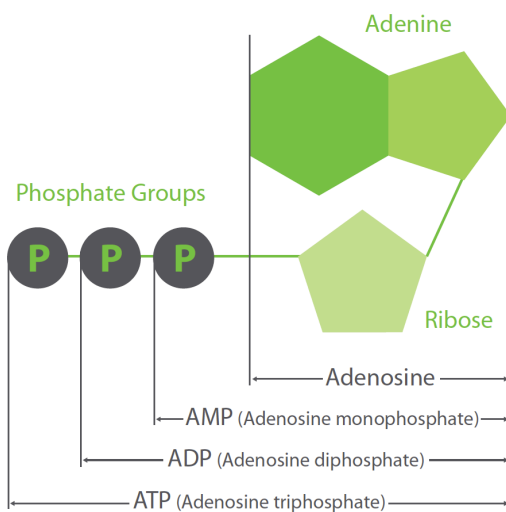
# Technical Information

## Adenosine is a Component of ATP which Regulates Cellular Metabolism

Adenosine is a nucleoside composed of apurine (adenine) and ribose, and as such is a component of adenosine triphosphate (ATP).<sup>1,2</sup> It is directly linked to the energy metabolism of the cell and participates in key metabolic pathways, such as nucleotide and nucleoside metabolism, sulphur-containing amino acid metabolism, trans-methylation reactions and metabolism of ammonia.<sup>3,4</sup>

ATP is a high energy phosphate compound important for cellular energy exchange. In addition to Adenosine, ATP contains three tightly bound phosphate groups. To obtain energy for cellular metabolism, the cell hydrolyses ATP, breaking the high energy bonds between phosphate groups, thereby releasing stored energy. As these phosphate groups are removed, ATP is reduced to adenosine diphosphate (ADP), then adenosine monophosphate (AMP), and finally adenosine.<sup>1,2</sup> (Figure 1)

**Figure 1: The chemical structure of ATP and its breakdown to ADP and AMP**



## Adenosine is an Inhibitory Neuromodulator in the Brain

Adenosine is an important neuromodulator that is thought to exert its main effect on brain function through pre-synaptic control of neurotransmitter release. It functions predominantly via the abundant inhibitory  $A_1$  receptors, and to a lesser degree via the  $A_{2A}$  receptors.<sup>3,5</sup> These receptors are vastly distributed throughout the body which explains the pivotal role adenosine plays in neurotransmission and metabolic activity. However, due to the greater density of  $A_1$  receptors as compared to  $A_{2A}$  receptors, and the fact that  $A_1$  receptors mainly exert an inhibitory effect on glutamate release, adenosine is thought to play a key role in the inhibition of neuronal excitability.<sup>3,6,7</sup>

Adenosine's neuromodulatory and neuroprotective role involves the balancing of inhibitory  $A_1$  receptors and facilitatory  $A_{2A}$  receptors, in other words the suppression and facilitation of neuronal activity.<sup>6,8</sup> Adenosine receptors are also considered important modulators of cell survival<sup>9</sup> that protect against a range of insults.<sup>6</sup>

Furthermore, brain ATP and its metabolites are important in nervous system processes involving the regulation of inhibitory and excitatory neurotransmission associated with the sleep/wake cycle. As a neuro-inhibitor, adenosine decreases the activity of cholinergic wake-promoting neurons in the basal forebrain where it accumulates during prolonged wakefulness and decreases during sleep recovery.<sup>10-12</sup>

## Summary

Adenosine is a homeostatic regulator of cellular energy, and acts as a neuromodulator and neuroprotectant.<sup>10</sup> It primarily exerts an inhibitory effect on glutamate release, thereby inhibiting neuronal excitation. Most evidence on adenosine receptors support its application in the neurological arena.<sup>6</sup>

However, efficacy of adenosine receptor activation is reduced by concomitant activation of glutamate receptors,<sup>9</sup> and concomitant use of caffeine.<sup>7,12</sup>

*References available upon request.*