Purine

A purine is a heterocyclic aromatic compound that consists of a pyrimidine ring fused to an imidazole ring. Purine gives its name to the wider class of molecules, purines, which include substituted purines and their tautomers, are the most widely occurring nitrogen-containing heterocycle in nature.

Purine is water soluble.

To preserve the disequilibrium between ATP and ADP necessary to drive cellular metabolism, enzymatic pathways rapidly convert ADP to adenosine and the downstream purines inosine and hypoxanthine. During ischemia, these same pathways result in the production of purines.

Tian et al. performed a prospective observational study to test whether purine levels in arterial blood might correlate with brain ischaemia. They made real-time perioperative measurements, via microelectrode biosensors, of the purine levels in untreated arterial blood from 18 patients undergoing regional anaesthetic carotid endarterectomy. Pre-operatively, the median purine level was 2.4 µM (95% CI 1.3-4.0 µM); during the cross-clamp phase, the purines rose to 6.7 µM (95% CI 4.7-11.5 µM) and fell back to 1.9 µM (95% CI 1.4-2.7 µM) in recovery. Three patients became unconscious during carotid clamping, necessitating insertion of a temporary carotid shunt to restore cerebral blood flow. In these, the pre-operative median purine level was 5.4 µM (range 4.7-6.1 µM), on clamping, 9.6 µM (range 9.4-16.1 µM); during shunting, purines fell to below the pre-operative level (1.4 µM, range 0.4-2.9 µM) and in recovery 1.8 µM (range 1.8-2.6 µM). Our results suggest that blood purines may be a sensitive real-time and rapidly produced indicator of brain ischaemia, even when there is no accompanying neurological obtundation [1)].

1)
Tian F, Bibi F, Dale N, Imray CHE. Blood purine measurements as a rapid real-time indicator of reversible brain ischaemia. Purinergic Signal. 2017 Aug 12. doi: 10.1007/s11302-017-9578-z. [Epub ahead of print] PubMed PMID: 28803399.