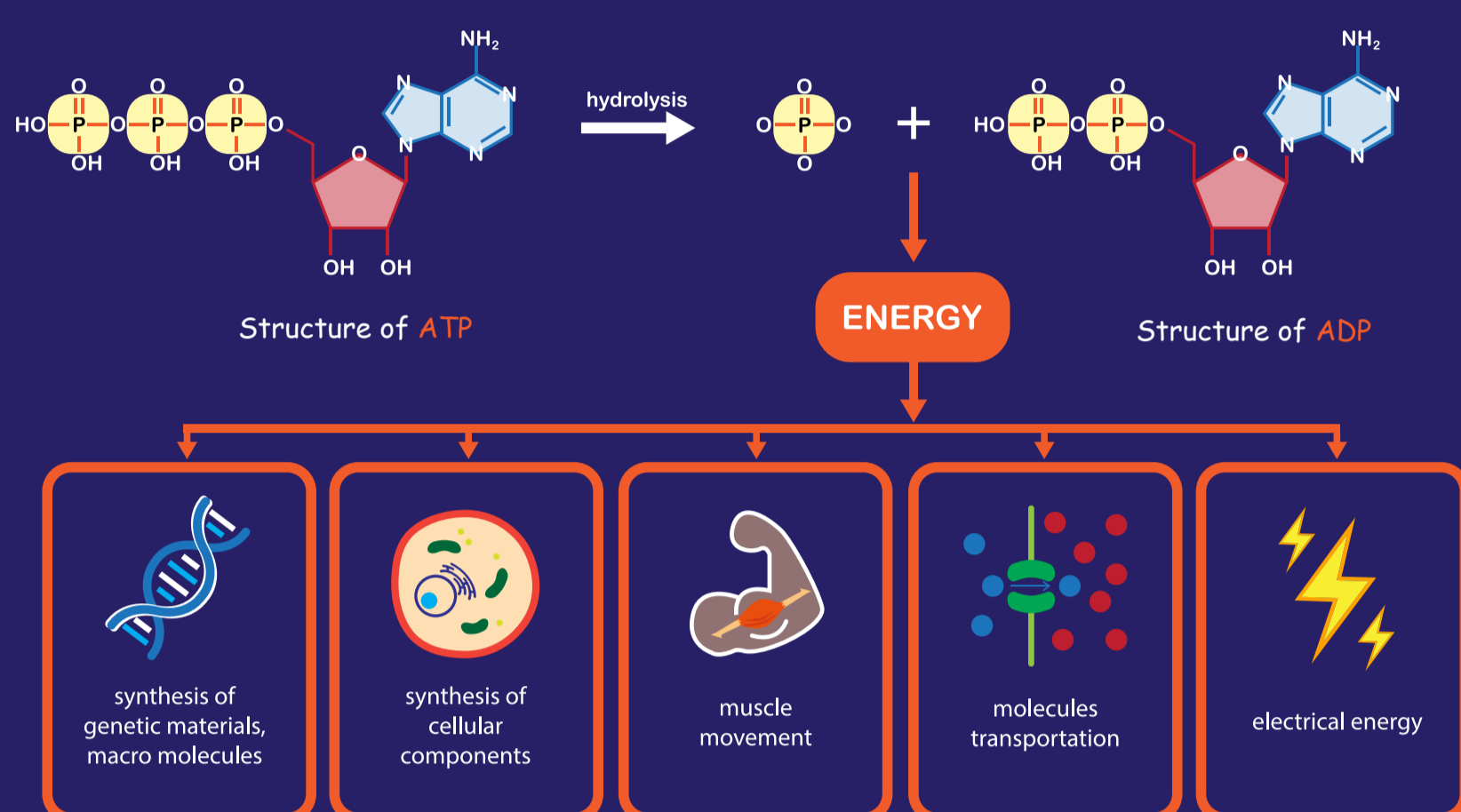


ATP ANALYSIS SOLUTION

Adenosine Triphosphate (ATP), is a nucleotide molecule ubiquitous in living organisms, from bacteria to humans. Functioning as the primary energy currency of the cell, ATP drives a plethora of biochemical reactions essential for life processes. Structurally, ATP comprises an adenine base, a ribose sugar, and three phosphate groups, hence the term "triphosphate."

The pivotal role of ATP lies in its ability to store and release energy within its high-energy phosphate bonds. When ATP undergoes hydrolysis, catalyzed by enzymes known as ATPases, it liberates one phosphate group, yielding ADP (Adenosine Diphosphate) and inorganic phosphate (Pi), along with a release of energy. This energy is harnessed by cells to perform an array of functions, including muscle contraction, biosynthesis, and active transport across cell membranes.

What is ATP Used For?



ATP Solutions in Creative Proteomics

- 1** ATP Concentration Measurement: Using mass spectrometry to measure ATP levels in samples, tracking changes within cells or organisms.
- 2** ATP Biosynthesis Pathway Study: Analyzing ATP synthesis pathways (e.g., glycolysis, citric acid cycle, oxidative phosphorylation) with mass spectrometry techniques.
- 3** ATP Degradation Pathway Investigation: Exploring ATP degradation pathways, including ATP hydrolysis and AMP synthesis, to understand ATP breakdown.
- 4** Enzyme Activity Assessment: Evaluating enzyme activities associated with ATP metabolism, such as ATP synthase and ATPases.
- 5** Metabolite Analysis: Identifying and quantifying intermediate metabolites in ATP metabolism to gain insights into cellular or organismal metabolic pathways.

ATP Analysis Technologies

Technologies	High-performance Liquid Chromatography	Mass Spectrometry
Instrumentation	<p>Chromatographic Columns:</p> <ul style="list-style-type: none"> Reverse-phase Columns: Utilize non-polar stationary phases for the separation of nucleotides based on hydrophobic interactions. Ion-exchange Columns: Employ charged stationary phases for the separation of nucleotides based on electrostatic interactions. 	<p>Types of Mass Analyzers:</p> <ul style="list-style-type: none"> Quadrupole MS: Selectively filters ions based on their mass-to-charge ratio. Time-of-Flight (TOF) MS: Measures the time taken for ions to travel a known distance, allowing for the determination of their mass. Ion Trap MS: Stores and selectively ejects ions based on their mass-to-charge ratio.
Quantitative Accuracy	Provides accurate quantification of ATP and its metabolites.	Offers high sensitivity with detection limits in the sub-nanomolar to picomolar range.
Sample Compatibility	Accommodates various sample types, including biological fluids and tissues, with minimal sample preparation.	Suitable for analyzing diverse sample matrices, including blood, urine, and tissue extracts, with minimal sample pre-treatment.
Method Optimization	Parameters can be optimized for optimal separation and detection, with typical flow rates ranging from 0.1 to 1 mL/min and column temperatures between 20-40°C.	Offers flexibility in method development, with optimization of ionization source parameters (e.g., voltage, gas flow) and chromatographic conditions (e.g., gradient elution, column chemistry).
Structural Elucidation	Limited capability for structural elucidation.	Facilitates structural elucidation of compounds through MS/MS fragmentation analysis.

Technical Features and Advantages

- Selectivity, precision and accuracy:** Targeted detection of metabolites, greatly improving the sensitivity, accuracy, specificity and reproducibility of detection, leading to absolute quantitative study of metabolites and information mining of metabolites.
- Stability:** Strict quality control system, ultra-high resolution ultra-high performance liquid chromatography-mass spectrometry system, and professional data pre-processing and analysis capabilities
- Simple, sensible, durable and fast method:** Characterized by simplicity, intuitiveness, durability, and speed, the approach offers efficient and user-friendly metabolite analysis solutions.

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