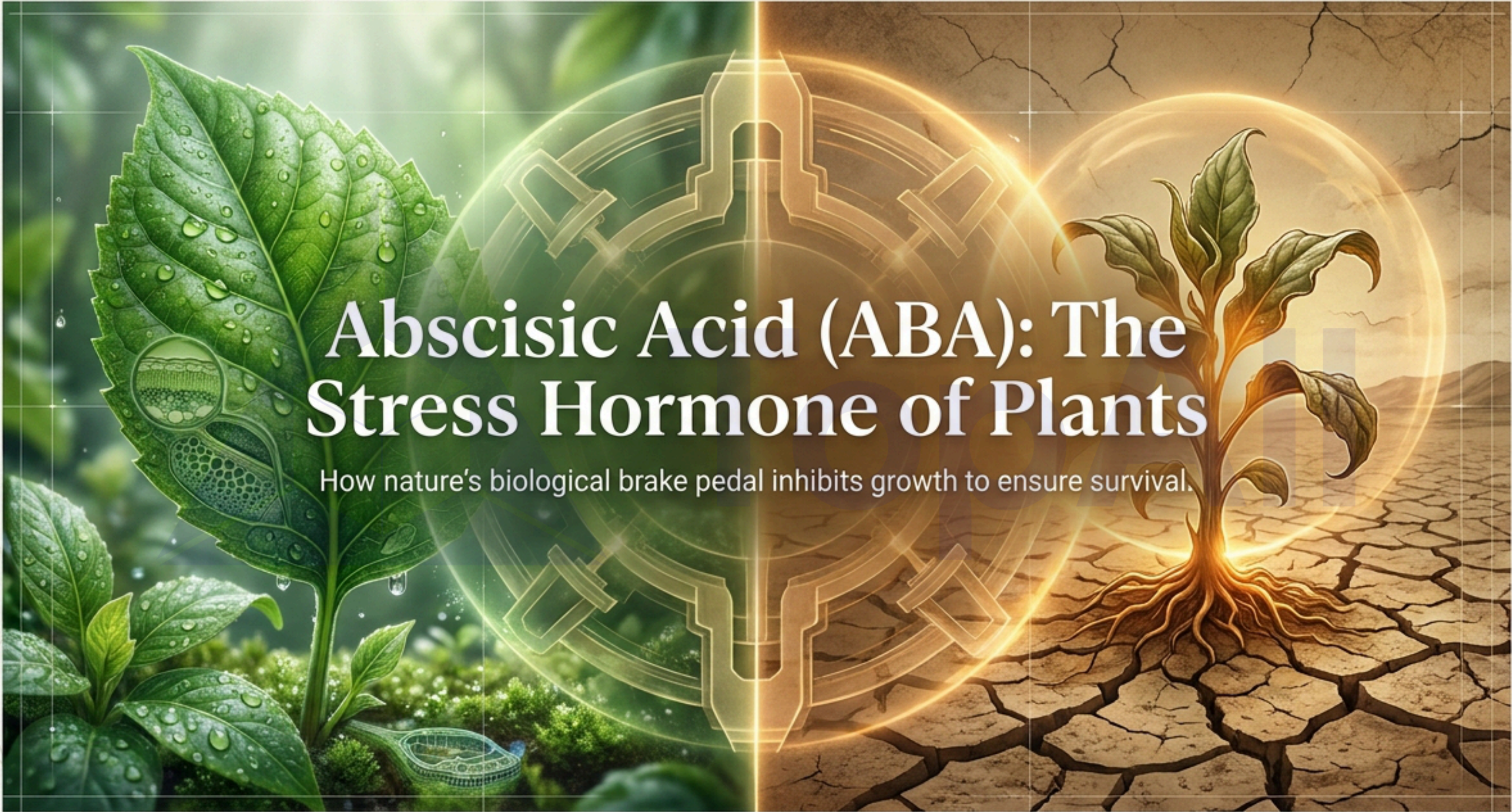




Absciscic Acid (ABA): The Stress Hormone of Plants

How nature's biological brake pedal inhibits growth to ensure survival.

The Master Inhibitor of Metabolism

The Gas

Gibberellins (GAs) drive relentless plant elongation, cell division, and metabolic activity.

The Brakes

Absciscic Acid (ABA) acts as a general plant growth inhibitor, actively slowing plant metabolism.

The Antagonism:

In almost all physiological situations, ABA acts as a direct antagonist to GAs. This push-and-pull relationship creates a vital biological equilibrium, preventing a plant from growing recklessly into dangerous conditions.



Preventing Premature Life: Seed Germination Inhibition





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The Emergency Responder: Stomatal Closure



State A: Normal Conditions

Rapid Water Loss: Open stomata allow essential gas exchange but cause high transpiration rates.



State B: Drought Stress

Water Conserved: During environmental stress, ABA is rapidly synthesized. It signals the guard cells to instantly close the stomata, stopping water from escaping.

The Ultimate Survival Shield



Drought

Heat

Desiccation Resistance:

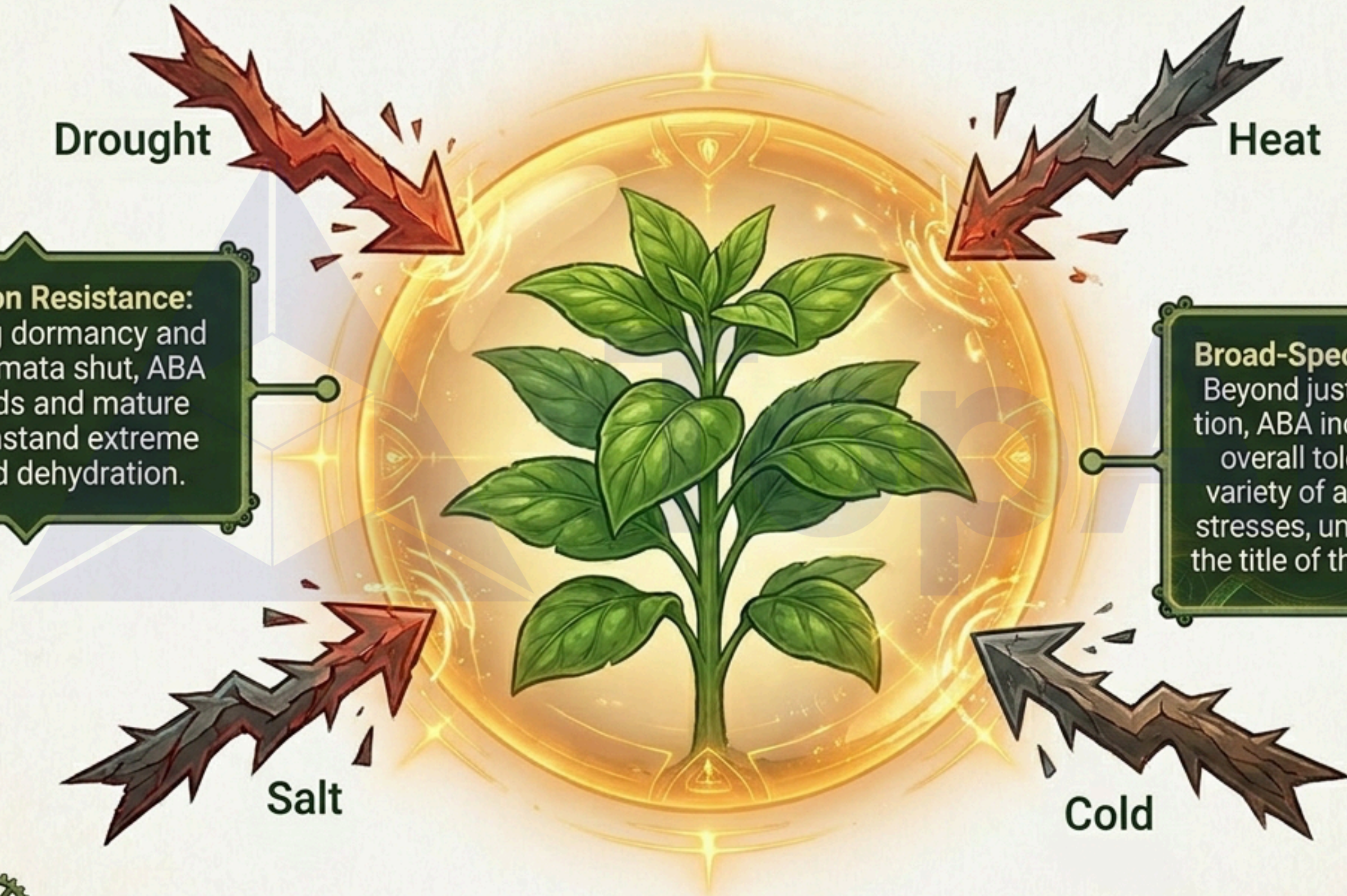
By inducing dormancy and locking stomata shut, ABA helps seeds and mature plants withstand extreme drying and dehydration.

Broad-Spectrum Protection:

Beyond just water conservation, ABA increases the plant's overall tolerance to a wide variety of abiotic (non-living) stresses, universally earning it the title of the stress hormone.

Salt

Cold



Summary: The Vital Brakes on Plant Growth



Plant Stage / System	The ABA Action (The Brakes)	The Survival Benefit
Seeds	Inhibits Germination	Prevents premature death in temporary warm spells.
Leaves & Buds	Induces Abscission & Dormancy	Conserves energy and protects vulnerable tissues before winter.
Environmental Response	Closes Stomata	Retains critical water and provides systemic desiccation resistance.

Key Takeaway: While other hormones promote relentless expansion, Abscissic Acid (ABA) is the essential biological brake. By managing dormancy, pausing metabolism, and closing stomata, ABA ensures the plant's ultimate survival in a hostile world.



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