

Biosafety Clearing-House (BCH)

GENETIC ELEMENT (GENE)

BCH-GENE-SCBD-115116-2

LAST UPDATED: 19 AUG 2019

General information

Name of genetic element

ATR serine/threonine kinase

EN

Alternate genetic element name(s) (synonym(s))

ATM and Rad3-related

EN

Abbreviation

ATR

EN

Category

Protein coding sequence

Is this genetic element a synthetic molecule?

No

Donor organism

Donor organism(s)

[BCH-ORGA-SCBD-246-6](#) ORGANISM | ZEA MAYS (MAIZE, CORN, MAIZE) |

Crops

Characteristics of the protein coding sequence

Biological function of the protein

Serine/threonine-protein kinase ATR (ATR) catalyzes the addition of a phosphate to serine or threonine residues. The protein plays a central role in cell-cycle regulation at the G2 phase checkpoint in response to single stranded DNA, DNA damage, and/or a replication block, but is not required for G2-arrest. This protein functions by transmitting DNA damage signals to downstream effectors of cell-cycle progression. Research has suggested that ATR may phosphorylate histone variant H2AX to form H2AXS139ph at sites of DNA damage to regulate the DNA damage response mechanism.

ATR is also required for the basal expression of RNR1 (ribonucleotide reductase large subunit) and for effective immune responses that involve the activation of DNA damage responses, as well as acting with telomerase to maintain telomeric DNA tracts. However, ATR is not

EN

required for telomere length homeostasis.

Related trait(s) or use(s) in biotechnology

Other

Sensitivity to DNA damaging agents

Impaired DNA repair

Additional Information

Other relevant website addresses and/or attached documents

? [NCBI: LOC103626462 serine/threonine-protein kinase ATR \[Zea mays \]](#) (*English*)

? [UniProtKB: ATR \(Arabidopsis\)](#) (*English*)

? [The Plant DNA Damage Response - Signaling Pathways Leading to Growth Inhibition and Putative Role in Response to Stress Conditions.pdf](#) (*English*)

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Further Information

Questions about the Cartagena Protocol on Biosafety or the operation of the Biosafety Clearing-House may be directed to the Secretariat of the Convention on Biological Diversity.

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on Biological Diversity**

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