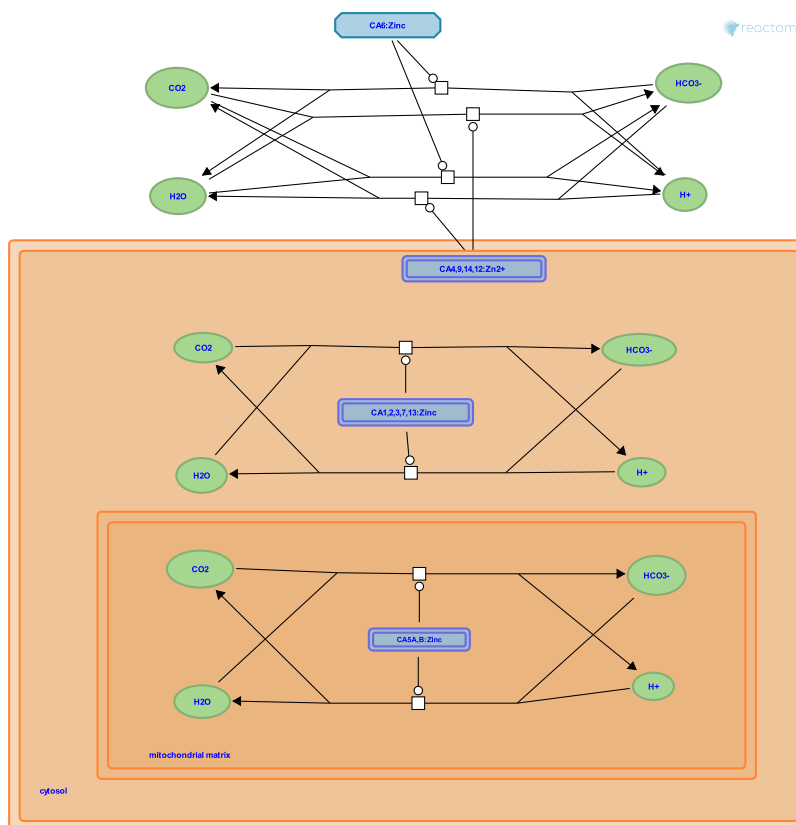


Reversible hydration of carbon dioxide



European Bioinformatics Institute, New York University Langone Medical Center, Ontario Institute for Cancer Research, Oregon Health and Science University.

The contents of this document may be freely copied and distributed in any media, provided the authors, plus the institutions, are credited, as stated under the terms of [Creative Commons Attribution 4.0 International \(CC BY 4.0\) License](https://creativecommons.org/licenses/by/4.0/). For more information see our [license](#).

This is just an excerpt of a full-length report for this pathway. To access the complete report, please download it at the [Reactome Textbook](#).

29/04/2024

Introduction

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

The development of Reactome is supported by grants from the US National Institutes of Health (P41 HG003751), University of Toronto (CFREF Medicine by Design), European Union (EU STRP, EMI-CD), and the European Molecular Biology Laboratory (EBI Industry program).

Literature references

- Fabregat, A., Sidiropoulos, K., Viteri, G., Forner, O., Marin-Garcia, P., Arnau, V. et al. (2017). Reactome pathway analysis: a high-performance in-memory approach. *BMC bioinformatics*, 18, 142. [↗](#)
- Sidiropoulos, K., Viteri, G., Sevilla, C., Jupe, S., Webber, M., Orlic-Milacic, M. et al. (2017). Reactome enhanced pathway visualization. *Bioinformatics*, 33, 3461-3467. [↗](#)
- Fabregat, A., Jupe, S., Matthews, L., Sidiropoulos, K., Gillespie, M., Garapati, P. et al. (2018). The Reactome Pathway Knowledgebase. *Nucleic Acids Res*, 46, D649-D655. [↗](#)
- Fabregat, A., Korninger, F., Viteri, G., Sidiropoulos, K., Marin-Garcia, P., Ping, P. et al. (2018). Reactome graph database: Efficient access to complex pathway data. *PLoS computational biology*, 14, e1005968. [↗](#)

Reactome database release: 88

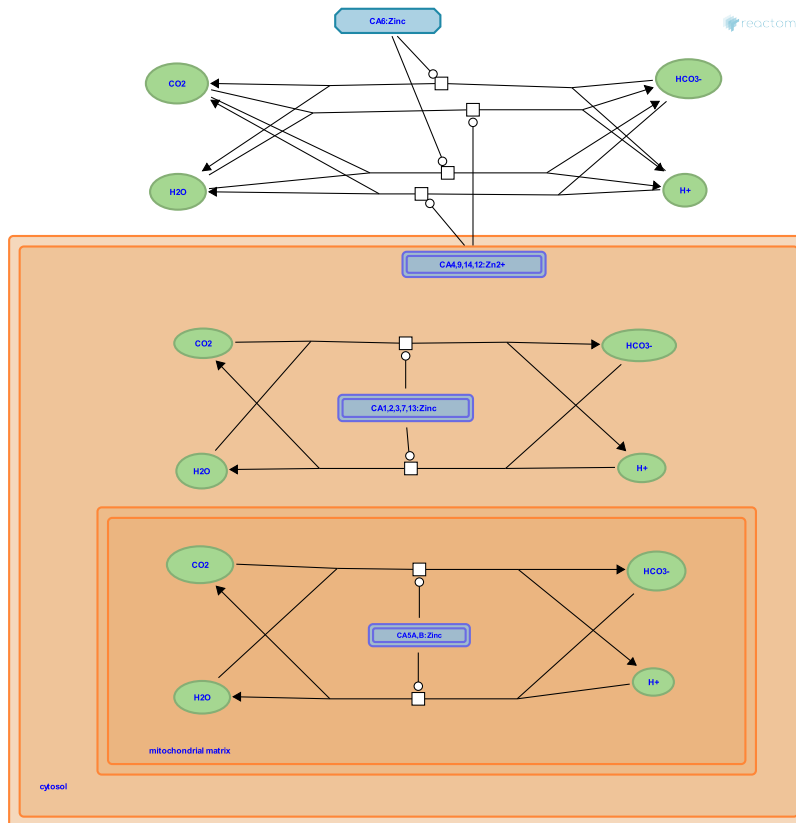
This document contains 1 pathway and 8 reactions ([see Table of Contents](#))

Reversible hydration of carbon dioxide ↗

Stable identifier: R-CEL-1475029

Compartments: cytosol, extracellular region, mitochondrial matrix, plasma membrane

Inferred from: [Reversible hydration of carbon dioxide \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Carbonic anhydrase hydrates carbon dioxide (cytosol) ↗

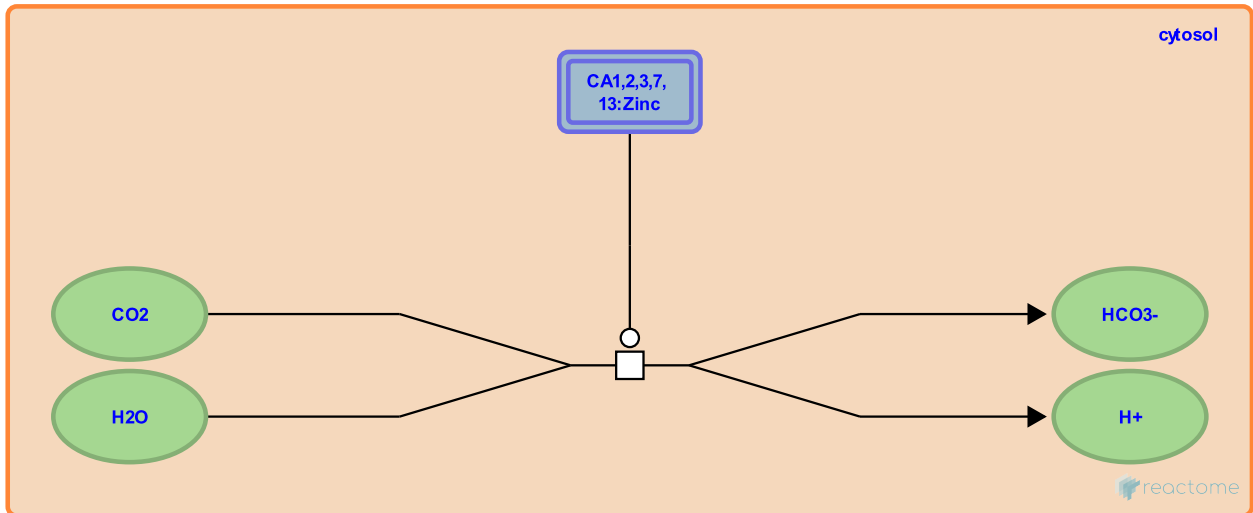
Location: [Reversible hydration of carbon dioxide](#)

Stable identifier: R-CEL-1475026

Type: transition

Compartments: cytosol

Inferred from: [Carbonic anhydrase hydrates carbon dioxide \(cytosol\) \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Carbonic anhydrase dehydrates bicarbonate (cytosol) ↗

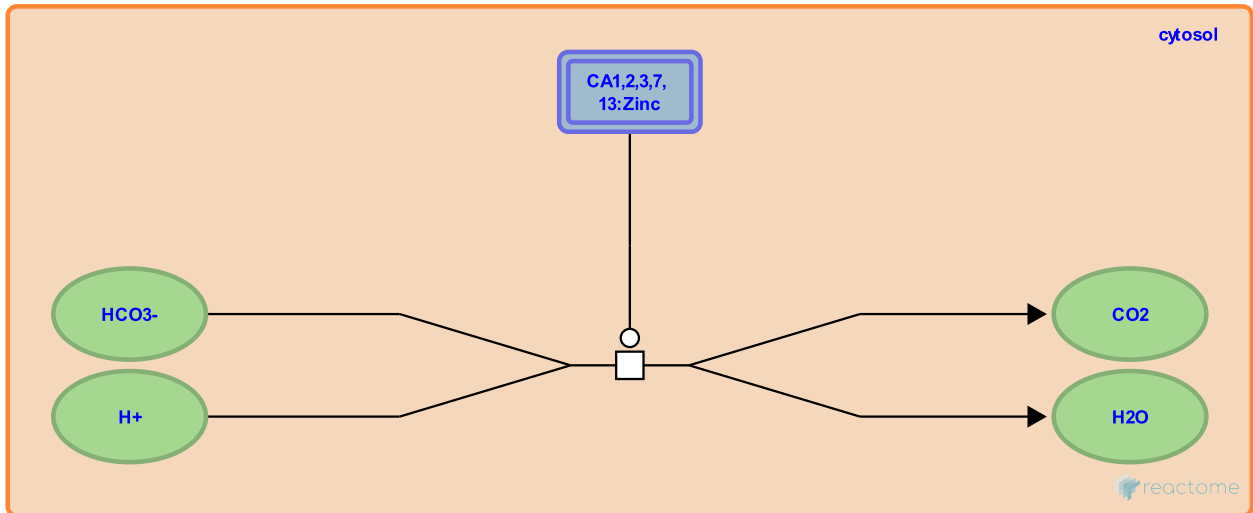
Location: [Reversible hydration of carbon dioxide](#)

Stable identifier: R-CEL-1475022

Type: transition

Compartments: cytosol

Inferred from: [Carbonic anhydrase dehydrates bicarbonate \(cytosol\) \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Carbonic anhydrase hydrates carbon dioxide (plasma membrane) ↗

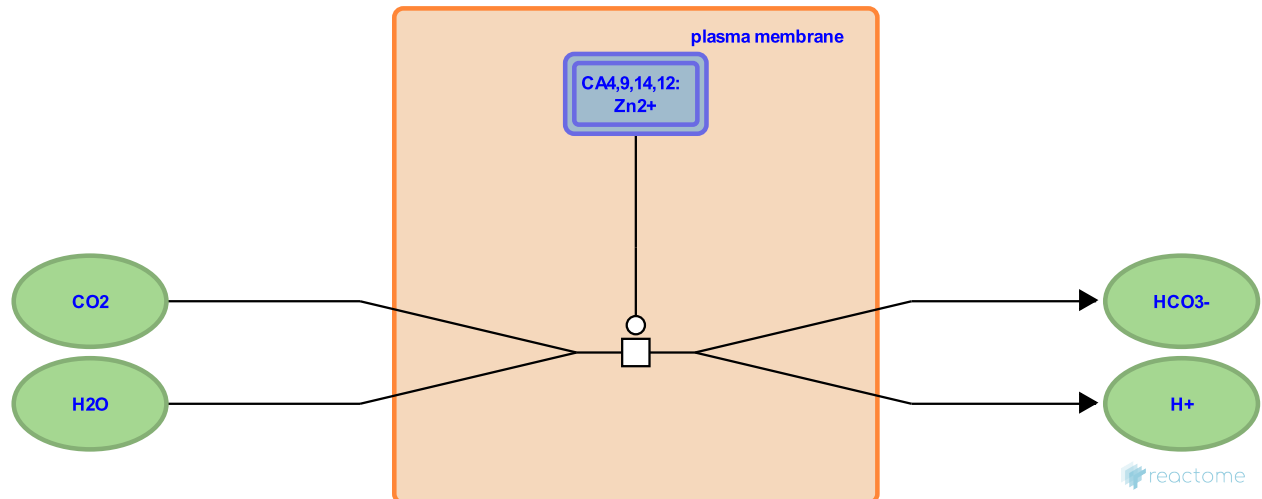
Location: [Reversible hydration of carbon dioxide](#)

Stable identifier: R-CEL-1475025

Type: transition

Compartments: plasma membrane, extracellular region

Inferred from: [Carbonic anhydrase hydrates carbon dioxide \(plasma membrane\)](#) (Homo sapiens)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](http://www.pantherdb.org/about.jsp) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Carbonic anhydrase dehydrates bicarbonate (plasma membrane) ↗

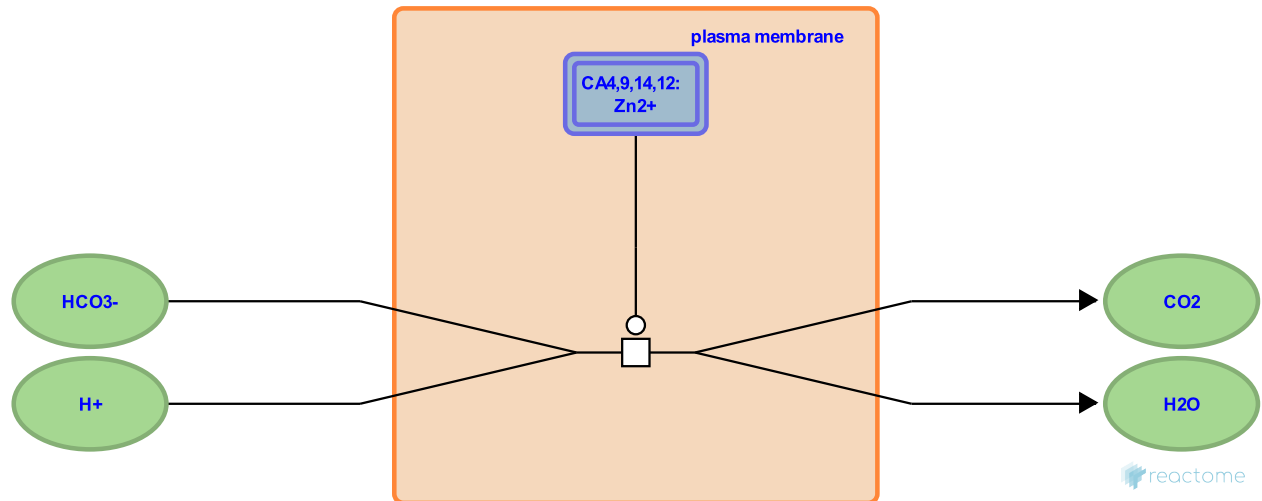
Location: [Reversible hydration of carbon dioxide](#)

Stable identifier: R-CEL-1475017

Type: transition

Compartments: plasma membrane, extracellular region

Inferred from: [Carbonic anhydrase dehydrates bicarbonate \(plasma membrane\) \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](http://www.pantherdb.org/about.jsp) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Carbonic anhydrase hydrates carbon dioxide (mitochondria) ↗

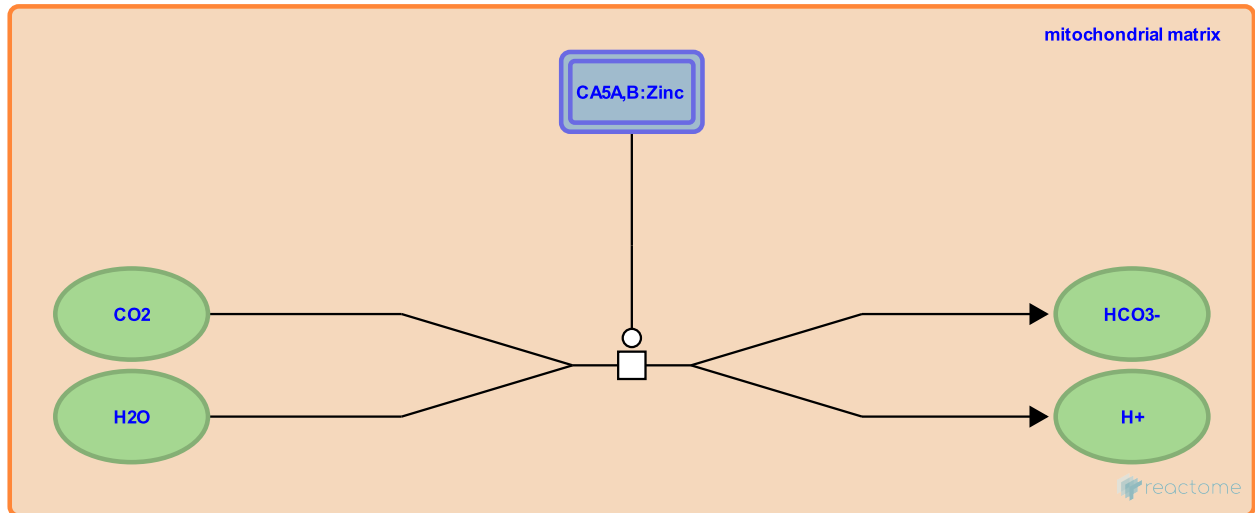
Location: [Reversible hydration of carbon dioxide](#)

Stable identifier: R-CEL-1475032

Type: transition

Compartments: mitochondrial matrix

Inferred from: [Carbonic anhydrase hydrates carbon dioxide \(mitochondria\) \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Carbonic anhydrase dehydrates bicarbonate (mitochondria) ↗

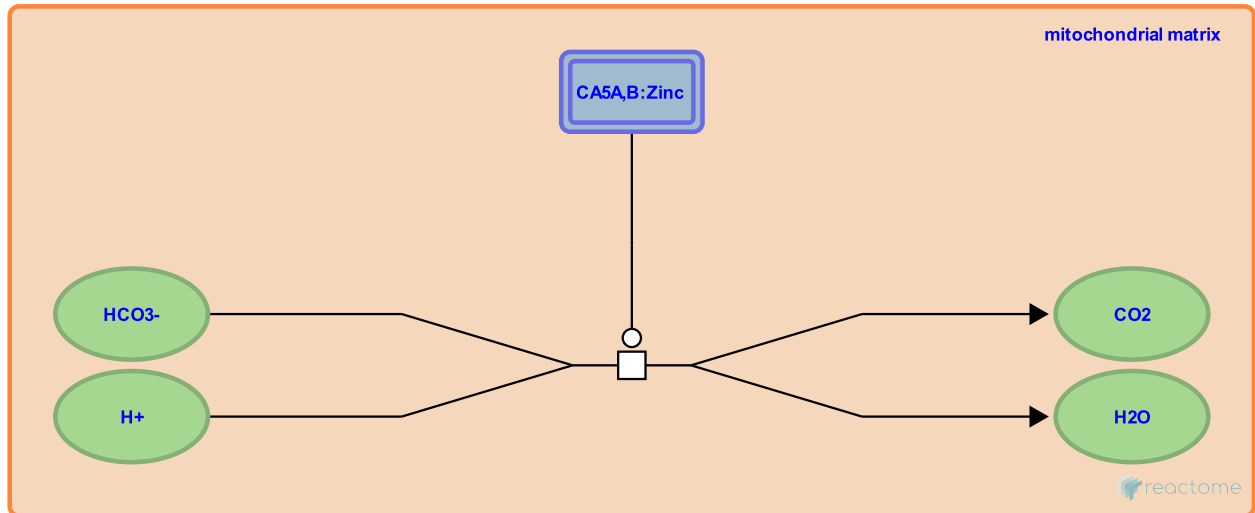
Location: [Reversible hydration of carbon dioxide](#)

Stable identifier: R-CEL-1475028

Type: transition

Compartments: mitochondrial matrix

Inferred from: [Carbonic anhydrase dehydrates bicarbonate \(mitochondria\) \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](#) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Carbonic Anhydrase VI hydrates carbon dioxide to bicarbonate and a proton [↗](#)

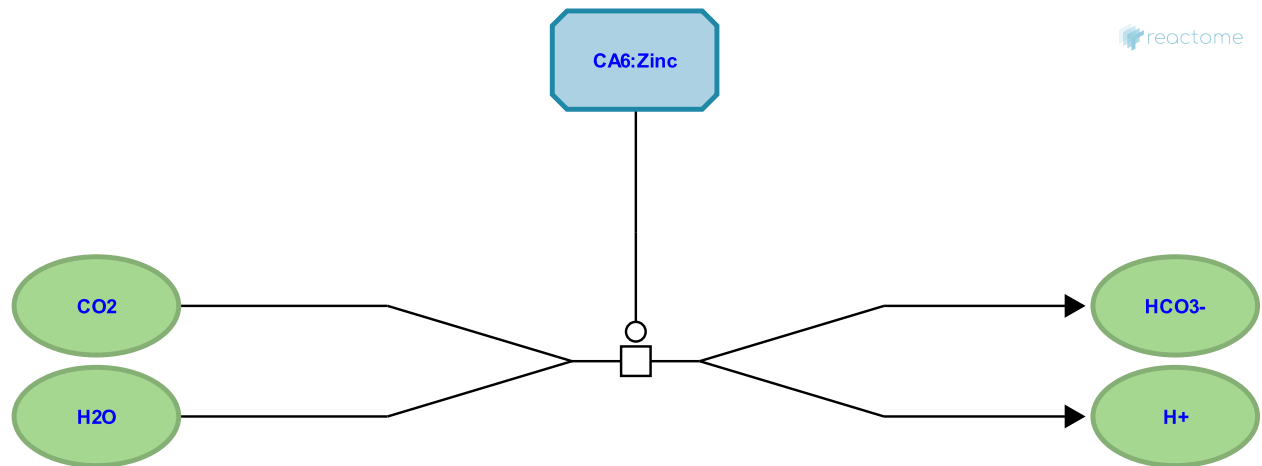
Location: [Reversible hydration of carbon dioxide](#)

Stable identifier: R-CEL-1237045

Type: transition

Compartments: extracellular region

Inferred from: [Carbonic Anhydrase VI hydrates carbon dioxide to bicarbonate and a proton \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](http://www.pantherdb.org/about.jsp) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Carbonic anhydrase VI dehydrates bicarbonate to water and carbon dioxide ↗

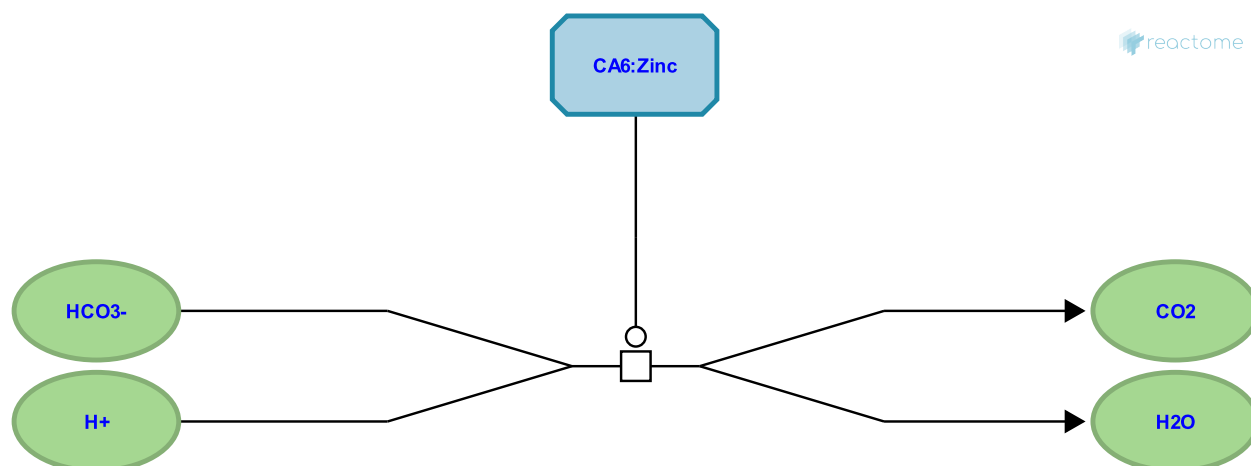
Location: [Reversible hydration of carbon dioxide](#)

Stable identifier: R-CEL-1237081

Type: transition

Compartments: extracellular region

Inferred from: [Carbonic anhydrase VI dehydrates bicarbonate to water and carbon dioxide \(Homo sapiens\)](#)



This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](http://www.pantherdb.org/about.jsp) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Table of Contents

Introduction	1
☒ Reversible hydration of carbon dioxide	2
↳ Carbonic anhydrase hydrates carbon dioxide (cytosol)	3
↳ Carbonic anhydrase dehydrates bicarbonate (cytosol)	4
↳ Carbonic anhydrase hydrates carbon dioxide (plasma membrane)	5
↳ Carbonic anhydrase dehydrates bicarbonate (plasma membrane)	6
↳ Carbonic anhydrase hydrates carbon dioxide (mitochondria)	7
↳ Carbonic anhydrase dehydrates bicarbonate (mitochondria)	8
↳ Carbonic Anhydrase VI hydrates carbon dioxide to bicarbonate and a proton	9
↳ Carbonic anhydrase VI dehydrates bicarbonate to water and carbon dioxide	10
Table of Contents	11