

早石修記念レクチャー2023

Osamu Hayaishi Memorial Lecture 2023

The Path to the Nobel Prize

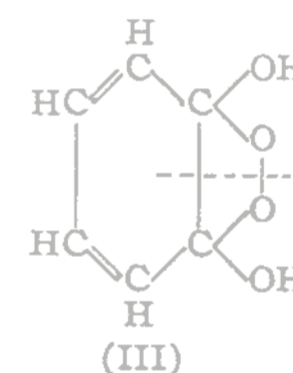
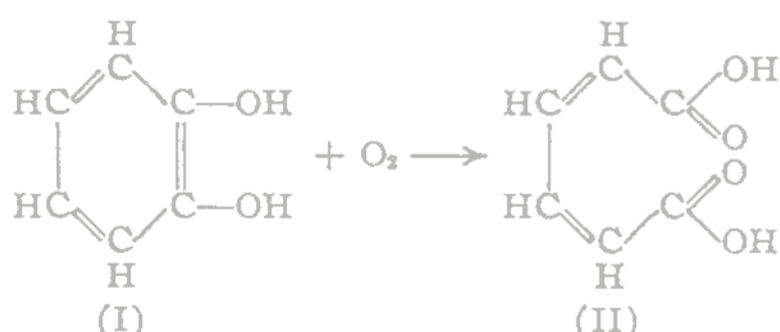


Richard J. Roberts

Chief Scientific Officer, New England Biolabs, Inc.

Pyrocatechase^{1,2} of *Pseudomonas* sp. catalyzes the oxidative cleavage of the aromatic ring of catechol (I) to *cis-cis*-muconic acid (II). Subsequent work has shown that pyrocatechase requires ferrous ion³ and sulfhydryl containing compounds⁴ for maximum activity, although the mechanism of electron transport as well as the nature of intermediate steps has remained unknown.

We wish to report some experimental results using O₂¹⁸ and H₂O¹⁸ which may aid in elucidating the mechanism of this unique enzymatic reaction. When the reaction was conducted in the presence of H₂O¹⁸, O¹⁸ was not detected in the product, *cis-*



cis-muconic acid. In the presence of O₂¹⁸, however, essentially all the oxygen enzymatically introduced into *cis-cis*-muconic acid was shown to be derived from molecular oxygen (Table I). The results clearly demonstrate that pyrocatechase is an oxygen transferase rather than a dehydrogenase and no hydration reaction is involved in the over-all process. *cis-cis*-Muconic acid semialdehyde is therefore excluded as an intermediate since any known mechanism of enzymatic aldehyde oxidation involves hydration. A compound such as (III) appears to be a more likely intermediate in the pyrocatechase reaction. Orthobenzoquinone ap-



oilpainting by Kiyoshi F.

October 3, 2023 15:00-18:00
Shirankaikan (芝蘭会館)

TIMETABLE

15:00 Opening Hirohide Saito
Lecture1 Masatoshi Hagiwara
Lecture2 Osamu Takeuchi
Lecture3 Hirohide Saito

**16:00 Osamu Hayaishi
Memorial Lecture
Richard J. Roberts**

17:00 Poster Session with Snack and Drink

Contact

**Osamu Takeuchi
Masatoshi Hagiwara
Hirohide Saito**

Kyoto University

075-366-7039

hsaito-g@cira.kyoto-u.ac.jp

参加費無料

主催

早石修記念レクチャー実行委員会

後援

