Novel Inhibitors of Mitochondrial Electron Transport

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ABSTRACT

Researchers at the University of California, Davis have discovered a class of compounds that both bind to a unique newly-discovered binding site in respiratory complex III and act as inhibitors of electron transport for use as mitochondrial anti-cancer drugs.

FULL DESCRIPTION

Higher basal levels of reactive oxygen species (ROS) in cancer cells make them susceptible to ROS-induced apoptosis. A major producer of ROS in the mitochondrial electron transport chain (METC), respiratory complex III is a natural target for anticancer drugs. Current inhibitors of respiratory complex III promote ROS production by competitively out binding natural ligands, necessitating a relatively high dosage level causing attendant off-target effects.

Researchers at the University of California, Davis have discovered a class of METC inhibitors that bind to a unique binding site within respiratory complex III. Inhibition of the METC increases ROS production in cancer cells triggering apoptosis. Due to natural ligands low affinity for this binding site, the effective dosage for these compounds is lower than current METC inhibitors, resulting in fewer side effects.

APPLICATIONS

- Mitochondrial anti-cancer drugs

FEATURES/BENEFITS

- Bind to a unique newly-discovered binding site that does not require competitive binding
- Lower effective dose
- Reduced chance for developing resistance
- Decreased potential for side-effects

RELATED MATERIALS

- Hagras MA, Stuchebrukhov AA. Internal switches modulating electron tunneling currents in respiratory complex III. Biochem Biophys Acta. 1857(6):749-58. doi: 10.1016/j.bbabio.2016.02.005 - 06/01/2016
- Muhammad A. Hagras and Alexei A Stuchebrukhov. Novel Inhibitors for a Novel Binding Site in Respiratory Complex III. The Journal of Physical Chemistry B. 2016. 120(10):2701-2708. doi: 10.1021/acs.jpcb.5b12347 - 03/17/2016

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,986,442	05/21/2024	2016-714
United States Of America	Issued Patent	11,058,645	07/13/2021	2016-714

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OTHER INFORMATION

KEYWORDS

respiratory complex III, switch, ROS, mitochondrial electron transport chain, METC, anti-cancer

CATEGORIZED AS

- **Biotechnology**
  - Genomics
  - Other
- **Medical**
  - Disease: Cancer
  - Gene Therapy
  - New Chemical Entities, Drug Leads
  - Other
  - Research Tools
- **Research Tools**
  - Other

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