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A game-changer of analyzing FAO activity

FAOBlue

<Fatty Acid Oxidation Detection Reagent>

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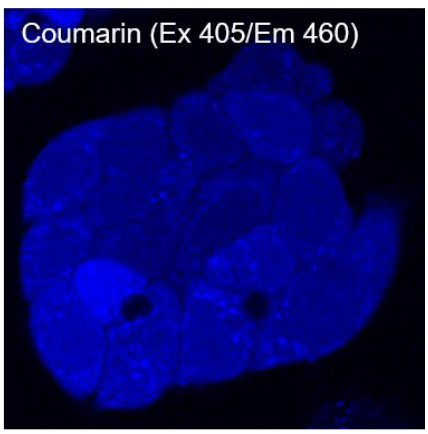
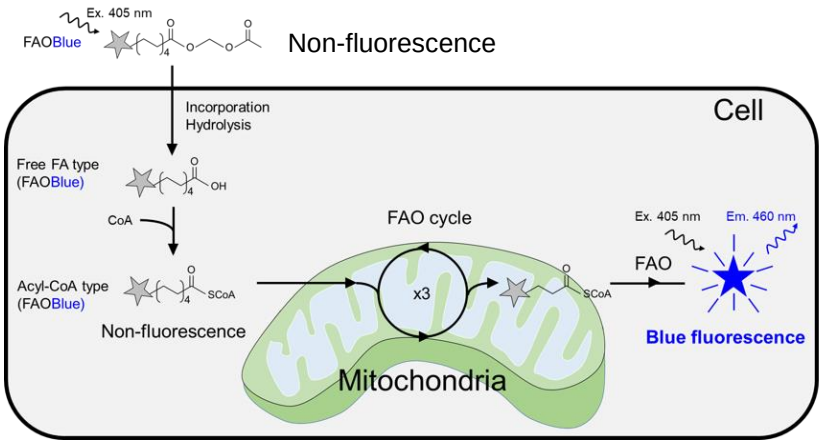
Presently there are no tools for direct FAO (Fatty Acid Oxidation) activity detection.

FAOBlue, a new fatty acid-derivative probe helps to directly detect overall FAO activity in live cells with quick and easy procedure.





About FAO

FAO is the important catabolic pathway for energy production in mitochondria and many associated pathway enzymes. Abnormal FAO activity is related to the causes of some diseases such as cancer or NASH (non-alcoholic steatohepatitis).

Principle

FAOBlue is a coumarin dye possessing a nonanoic acid protected by acetoxymethyl ester and it shows little fluorescence excited by 405 nm before metabolization by FAO. Once FAOBlue enter into cells through direct penetration of cell membrane, it is degraded in FAO cycle and shows strong blue fluorescence.

Features

- **Can observe FAO activity directly**
- **Easy procedure with no special equipment**
- **Have used in NASH model mouse and various cell lines**
- **Can observe perturbation of lipid-degradation by drug treatment**
  - ➡ **Help to develop seeds of new medicine related lipid metabolism**

Original paper

Uchinomiya *et al.*, *Chem. Commun.*, **56**, 3023-3026 (2020)

Product information

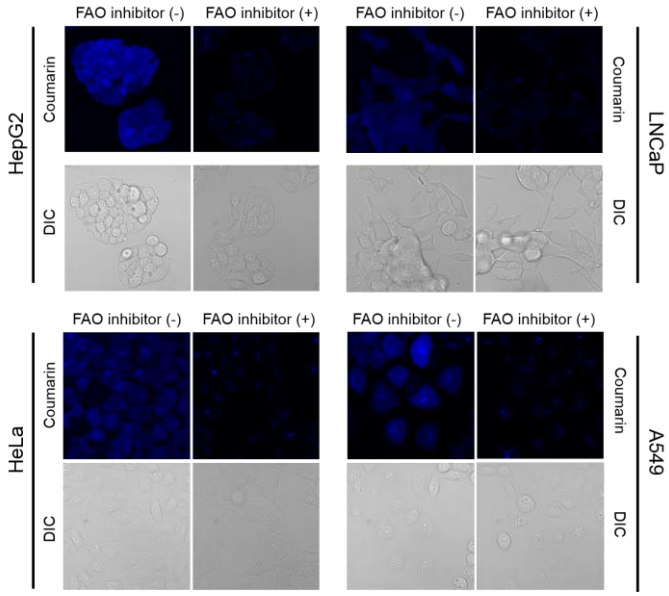
Product Name	Code	Size	Storage	Maker	Price/Detail
FAOBlue <Fatty Acid Oxidation Detection Reagent>	FDV-0033	0.2 mg	-20 ℃	FNA	

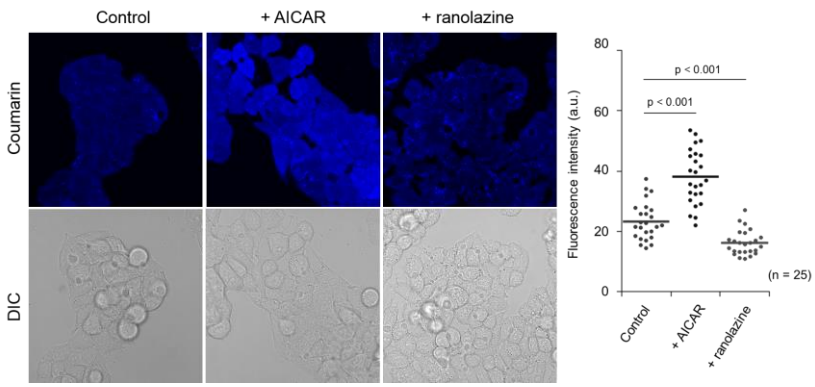
*NOTE: Proper excitation filters is needed to be used. In detail, please refer to our website.

Application data

Visualization of FAO activities in 4 cancer cell lines

Four cancer cell lines (HepG2, LNCaP, HeLa and A549) were treated with FAOBlue in HBS buffer with or without pre-treatment of etomoxir (40 μM, 3 hours), a potent FAO inhibitor. After FAOBlue incubation, blue fluorescence (Ex. 405 nm / Em. 430-480 nm) was observed. All cell lines showed blue fluorescence in cytosol, but pre-treatment of etomoxir clearly decreased fluorescent intensities.
These results indicated the blue fluorescence was derived from FAO activity in the cells.



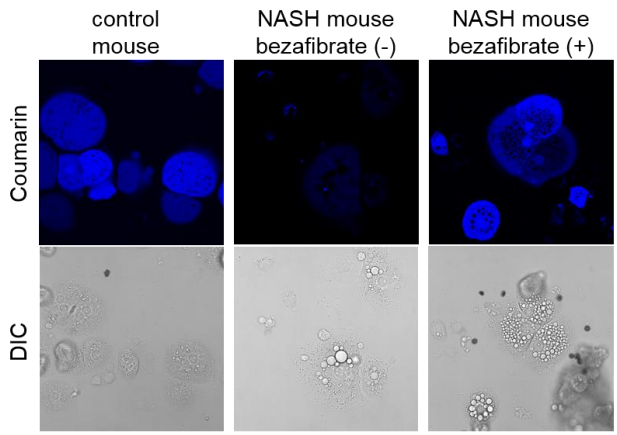


Perturbation of FAO activity by drugs

HepG2 cells were pre-incubated with 200 μM AICAR, a FAO activator via AMPK activation, for 3 hours or 200 μM of ranolazine, a partial FAO inhibitor, for 12 hours.
After drug treatment, the cells were incubated with 5 μM FAOBlue for 30 min. Compared with control cells, pre-treatment with AICAR significantly increased blue fluorescent intensity. On the other hand, pretreatment with FAO inhibitor ranolazine clearly decreased blue fluorescent intensity.

Analysis of NASH model mouse

Non-alcoholic steatohepatitis (NASH) is a typical disease which shows low metabolic activity of FAs.
Control healthy mice and NASH model mice were orally administered with bezafibrate, a therapeutic agent of NASH, after that, primary hepatocytes were isolated from control mice and NASH model mice and cultured. Primary hepatocytes were further treated with 5 μM FAOBlue for 30 min and fluorescence imaging was performed.
Compared with control cells, NASH model mouse-derived hepatocytes showed low FAO activity. On the other hand, Bezafibrate dramatically recovered FAO activity.
FAOBlue is a powerful tool to estimate drug effects and efficiency on FAO activity.



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