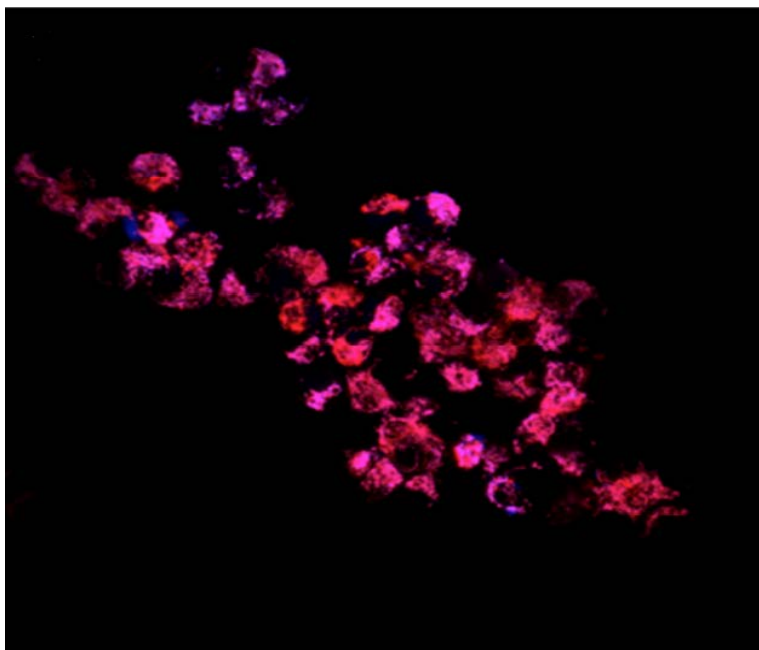


Dual fluorophore ratiometric probe for real-time mitochondrial pH measurement



Overlap image of the fluorescence from a pH-independent (Cy5) and pH-dependent (5Fluo) channels

Ref. Nr

6.1807

KeywordsMitochondrial pH
pH measurement
Dual fluorophore probe
Drug screening
Diagnosis

Intellectual PropertyPriority 21.03.2018 (EP)
PCT/EP2019/057012

Date

11/09/2019

Description

Despite earlier efforts engaged in developing efficient and reliable fluorescence-based mitochondrial pH probes, existing tools come with issues such as undesired side effects, inefficient detection on intact whole-cells or long measurement time.

We propose here a dual fluorophore ratiometric probe, incorporated into a living whole-cell in its inactive form, and de-protected rapidly once in the mitochondrial compartment allowing to provide a real-time and reproducible pH measure in vitro.

Advantages

The properties of the inactive probe both facilitate its delivery into the cell and promote its quick transportation and selective accumulation into the mitochondria, procuring cells ready for analysis within only 30 minutes.

Furthermore, when converted into its active form characterized by a lower oxidation state, the probe has a reduced impact on the mitochondrial electrochemical environment and a reduced efflux rate thanks to its hydrophilicity.

Applications

- Measure homeostatic mitochondrial pH for different cell types, and study its role in stem cell fate determination.
- Detect changes in mitochondrial pH upon pharmacological treatment: cytotoxicity measure, drug specificity screening e.g. for cancer therapies.
- Diagnose various diseases hallmarks e.g. proton leak regulation in diabetes or obesity, platelet metabolic disorders, immune diseases.