



CPDM

Center for Photodynamic Medicine
Kochi Medical School, Kochi University

NEWS LETTER 光線医療センター

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東京工業大学 TC カレッジ 来学視察

9/29 (木)、東京工業大学から、TCカレッジ (高い技術力・企画力を持つ高度技術職員養成制度) の担当者が来学されました。医学部においては、光線医療センターの活動を視察され、井上啓史センター長がセンターのプロジェクトを説明しました。

* 東京工業大学 TCカレッジ:

<https://www.ofc.titech.ac.jp/tc-college/>



光線医療 関連 講演会

ライ・ハンウェイ先生および井上啓史センター長が、下記の光線医療関連の講演をされました。

9/29 (木)、第30回 がん検診・診断学会総会 シンポジウム

「光線力学診断 (PDD) の今、光線力学スクリーニング (PDS) の未来」(井上)

9/30 (金)、第81回 日本癌学会学術総会

「Elucidation of cell senescence-associated porphyrin metabolism affecting ALA mediated-photodynamic diagnosis for cancer.」(ライ)



Abstract No. P-2308

Elucidation of cell senescence-associated porphyrin metabolism affecting ALA mediated-photodynamic diagnosis for cancer

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Abstract

Aminolevulinic acid-photodynamic diagnosis (ALA-PDD) is a promising alternative method for diagnosing cancer cells due to its high specificity and low side effect nature. Protoporphyrin IX (PpIX) in the cell emits red fluorescence following light irradiation and contributes to effectiveness of ALA-PDD. Cell senescence is known as a tumour suppressive process as it suppresses proliferative capabilities of cancer cells and their malignant progression. This relatively inactive state is believed to reduce drug resistance mediated by drug efflux. This research elucidated the role of ABCG2, a PpIX efflux transporter, in PpIX accumulation and efficacy of ALA-PDD in senescent cancer cells.

Transporters in porphyrin metabolism

Young cells Old cell

Cell Line	Relative band intensity (ABCG2/Actin)
T24	~1.0
253J-BV	~1.4
HT1197	~1.8

* p < 0.05

Senescence model

3 indicators of cell senescence

(A) Cell senescence associated-β-galactosidase

(B) Cell senescence & cell arrest markers

Marker	Young cells	Old cell
p16 (Cell senescence)	Low	High
p21 (Cell arrest)	Low	High
Actin	Consistent	Consistent

(C) Morphology changes (Large, flattened old cells)

Protoporphyrin IX production

Protoporphyrin IX concentration following fumitremorgin C (ABCG2 inhibitor) in old and young cells

Fluorescence

Cell Line	Control	FTC
T24	~4000	~12000
HT1197	~8000	~16000

p < 0.0005, # p < 0.001

Conclusion

Our research suggest old cells are more susceptible to ALA-PDD compared to young cells due to higher ABCG2 expression in old cells. The usage of fumitremorgin C (FTC), a ABCG2 inhibitor, could act as a potential drug to enhance the efficacy of ALA-PDD in young cells.

Young cell: High PpIX efflux → Low PDD efficacy
 Young cell + ABCG2 inhibitor: Reduced PpIX efflux → High PDD efficacy
 Old cell: High PpIX efflux → Low PDD efficacy

Learn more about the researcher here →

Conflict of Interest (COI) Disclosure Information:
Lead Presenter & Principal Researcher:
Dr. Lai Hung Wei;
We have no financial relationships to disclose.

光線医療センター ニュースレター

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<https://www.kochi-u.ac.jp/kms/CPDM/index.html>