

RESEARCH TOPIC FOR THE PARISTECH/CSC PHD PROGRAM
(one page maximum)

Field: Chemistry, Physical Chemistry and Chemical Engineering

Subfield: Chemistry

Title: Photocatalysis in Living Cells with Earth Abundant Metals for Cancer Therapy

ParisTech School: Chimie ParisTech | PSL

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Research group/Lab: Institute of Chemistry for Life Sciences,

(Lab/Advisor website): www.gassergroup.com

Short description of possible research topics for a PhD: Photodynamic Therapy (PDT) is an approved medical technique to treat certain types of cancer. However, cancer cells have a lower amount of oxygen than healthy ones, limiting the success of PDT treatments since oxygen is one of the three required components with the presence of a photosensitizer and light. Recently, it was demonstrated that Ir(III) complexes could kill cancer cells upon light irradiation without the presence of oxygen.¹ *In this project, we aim at developing novel complexes based on biocompatible, earth-abundant metal complexes to kill cancer cells.*

Required background of the student: The applicant should have a sound knowledge (theoretical and practical) in both inorganic and organic chemistry and be proficient with analytical techniques such as NMR and MS. The applicant must be fluent in English since it is the language spoken in the Gasser group. Practical knowledge in biology would be an asset.

A list of 5 (max.) representative publications of the group:

1. H. Huang, S. Banerjee, K. Qiu, P. Zhang, O. Blacque, T. Malcomson, M.J. Paterson, G.J. Clarkson, M. Staniforth, V.G. Stavros, **G. Gasser**,* H. Chao,* and P.J. Sadler,* *Nature Chem.*, **2019**, *11*, 1041-1048.
2. J. Karges, S. Kuang, F. Maschietto, O. Blacque, I. Ciofini, H. Chao,* and **G. Gasser**,* *Nature Commun.*, **2020**, *11*, 3262.
3. J. Karges, F. Heinemann, M. Jakubaszek, F. Maschietto, C. Subecz, M. Dotou, R. Vinck, O. Blacque, M. Tharaud, B. Goud, E. Viñuelas Zahínos, B. Spingler,* I. Ciofini,* and **G. Gasser**,* *J. Am. Chem. Soc.*, **2020**, *142*, 6578-6587.