

**Master 2 internship project
Year 2026-2027**

Laboratory/Institute: Institut de Biologie Structurale
Team: I2SR

Director: Prof Winfried Weissenhorn
Head of the team: Dr Joanna Timmins

Name and status of the scientist in charge of the project: Dr Fabienne Hans

HDR: yes ☒ no ☐

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Program of the Master's degree in Biology:

- ☐ Microbiology, Infectious Diseases and Immunology ☐ Biochemistry & Structure
☒ Physiology, Epigenetics, Differentiation, Cancer ☐ Neurosciences and Neurobiology

- Title of the project:

Mapping the cellular distribution of YB1, a potential base excision repair (BER) accessory factor, in response to oxidative stress.

- Objectives (up to 3 lines):

The objectives are to determine how oxidative stress affects the nuclear and cytoplasmic distribution of YB1 in cancer cells lines and to investigate whether these changes correlate with its association with the BER glycosylase NTH1, using a combination of microscopy and biochemical techniques.

- Abstract (up to 10 lines):

The BER contributes to genome maintenance and stability by repairing endogenous DNA base lesions resulting, among others, from oxidative stress. We have shown that the stress response factor Y-box-binding protein 1 (YB1) stimulates the DNA repair activity of NTH1, a DNA glycosylase of the BER, and that inhibiting the YB1/NTH1 interaction partially resensitizes MCF7 cells to the therapeutic agent cisplatin¹. Our goal is now to evaluate the cytoplasmic and nuclear distribution of YB1 in response to oxidative stress, using quantitative confocal and dSTORM super-resolution microscopy techniques. The highly motivated M2 student will perform these experiments in cancer cell lines expressing varying levels of YB1, using validated antibodies against YB1 generated in the laboratory. These results will be further complemented by biochemical analyses assessing YB1 association with NTH1, in response to oxidative stress.

- Methods (up to 3 lines):

The cellular distribution of YB1 will be quantitatively evaluated using fluorescent confocal and super resolution microscopy techniques, available on the [IBS-M4D imaging platform](#) and the YB1/NTH1 interactions will be probed by Western-Blot, using NTH1 pulldown samples available in the lab.

- Up to 3 relevant publications of the team:

1- Senarisoy M, Barette C, Lacroix F, De Bonis S, Stelter M, **Hans F**, Kleman J.P., Fauvarque M.O., and Timmins J (2020). Förster Resonance Energy Transfer Based Biosensor for Targeting the hNTH1–YB1 Interface as a Potential Anticancer Drug Target. ACS Chem. Biol. 15, 990-1003, [DOI](#).

2- **Hans F**, Senarisoy M, Bhaskar Naidu C, and Timmins J (2020) Focus on DNA Glycosylases - A Set of Tightly Regulated Enzymes with a High Potential as Anticancer Drug Targets, Int J Mol Sci., 21, 9226, [DOI](#).

3- Caron P, **Hans F** and Timmins J (2026) Navigating the Base Excision Repair pathway in chromatin - Focus on oxidative DNA damage Nucleic Acids Research, *Accepted under revisions*.

- Requested domains of expertise (up to 5 keywords):

Cell biology, fluorescence microscopy, Western-Blot, DNA repair, computational biology.