



PhD Joint Program Centre National de la Recherche (CNRS) Weizmann Institute of Science (WIS) - 2022-2025

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Two Ph.D. grants (3-year duration, starting Oct. 2022) have been awarded to our French/Israeli consortium, one for each country, to develop a **chemical biology program aiming at deciphering the biology of a peculiar RNA structure referred to as G-quadruplex RNA** (or G4-RNA) in human cells and diseases (chiefly cancers and neuropathology). The position at WIS (in Rehovot, IS) has been filled; **the position at CNRS (in Dijon, FR) is still open.**

The functional relevance of G4-RNA in human cells has progressed at a pace dictated by the advances in chemical biology techniques and methodology. The prevalence of G4-RNA in human cells has been investigated *in vitro* thanks to rG4-seq combining ligand-stabilized G4-RNA, reverse transcriptase stalling and sequencing (cf. C. K. Kwok *et al.*, *Nat. Methods* **2016**, *13*, 841) while G4RP-seq was developed for *in vivo* investigations (our work), being based on G4 isolation using the small molecule BioTASQ followed by sequencing (cf. S. Y. Yang *et al.*, *Nat. Commun.* **2018**, *9*, 4730 & *Nat. Protoc.* **2022**, *17*, 870).

In the present project, we will go a step forward, combining sequencing and proteomics, focusing on the involvement of G4-RNA in stress response. Stress granules (SGs) are transient, cytoplasmic membraneless condensates, composed of proteins and untranslated mRNAs. Although RNA-binding proteins that may control G4-RNA were recently speculated to regulate SG assembly, it is unknown whether G4-RNA play a direct regulatory role in SG biology. The Hornstein lab (WIS, Rehovot, IS) is an expert of RNA biology and SG proteomics, especially in the framework of neurodegenerative diseases (cf. Marmor-Kollet *et al.*, *Mol. Cell.* **2020**, *80*, 876); the Monchaud/Valverde lab (ICMUB, Dijon, FR) is an expert of the design of molecular tools aiming at deciphering the prevalence and functional relevance of G4-RNA in human cells. **The Ph.D. position available in France will be focused on the synthesis and characterization of chemical biology tools** (TASQ derivatives, cf. Stefan & Monchaud, *Nat. Rev. Chem.* **2019**, *3*, 650) to study G4-RNA impact on SG composition and dynamics and characterize G4-RNA binding proteins in the aim of better understanding SG biology.

The position is thus open to a chemist by training eager to work in a chemical biology research program, that is, at the interface between chemistry, biophysics, cellular biology and optical imaging, and interested to be part of an international collaboration in which short missions in both countries will be regularly planned.

-> Interested? Please contact david.monchaud@cnrs.fr; Ibai.Valverde@u-bourgogne.fr