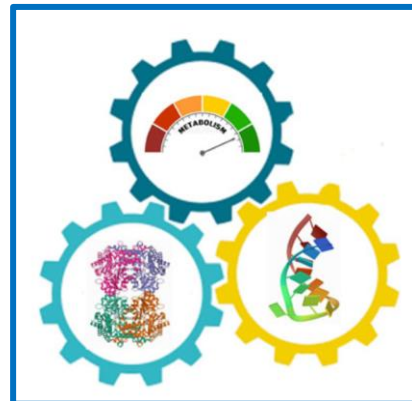


**Project title:** *RNA as a new player in the allosteric control of cellular metabolism: role of riboregulation in cancer*

**Acronym:** *RIBOREG*

**Partners:**

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**Description:**

Dozens of metabolic enzymes, involved in various pathways, exhibit RNA-binding properties in living cells. These RNA–enzyme interactions suggest novel roles of RNA in affecting enzyme function, as competitive inhibitor or allosteric regulator, or as an assembly scaffold for enzyme complexes. We propose to describe how the modulatory RNAs interact with and regulate chosen metabolic enzymes. Starting from the structure and function of the complex between the one-carbon metabolism enzyme serine hydroxymethyltransferase (SHMT) and its cognate RNA modulator, we will extend our analysis to the interaction of RNA with the dTMP synthesis complex, formed by SHMT, Thymidylate Synthase and Dihydrofolate Reductase.

**Aims:**

In this project, we will characterize the structural and functional properties of selected metabolic enzymes known to bind RNA, such as i.e. SHMT, Thymidylate Synthase and Dihydrofolate Reductase. We will study these enzymes in complex with their modulatory RNAs, both in vitro and in cancer cells. Moreover, we will study how modulatory RNAs act in different compartments of cancer cells and we will evaluate the effect of these RNAs on cell viability, metabolic profile and motility.

**Expected results:**

With this project we expected to study selected RNA/metabolic enzymes complexes in order to broaden our knowledge on the mechanism of riboregulation of cellular metabolism and inspire new approaches for studying, detecting, and using RNAs as metabolic switches in cancer. The aim is to identify an innovative class of RNA molecules, acting as allosteric modulators of specific metabolic enzymes, to be further developed into future therapeutic tools to fight cancer.

**Funded by the European Union – Next Generation EU, M4C2 – CUP B53D23015940006**