**REGE**

**Prof. Irene Bozzoni**

**PROGRAM 2021-2022**

* Genome and functional complexity of eukaryotes: coding and non coding RNAs. The “RNA World”
* RNA maturation: capping, splicing and polyadenylation.
* Alternative splicing as a mechanism to increase functional complexity - cis- and trans- acting factors
* Alternative splicing alterations and human pathologies (SMA, BRCA1, (Duchenne Muscular Dystrophy)
* Splicing regulation and cell differentiation (sex determination in Drosophila)
* RNA export
* Control of RNA stability
* RNA quality control: the nonsense mediated decay pathway
* mRNA turnover: destabilizing sequences and factors, decapping and deadenylation
* Chromatin structure and histone modifications
* The “mRNA Factory”: coupling between transcriptional and post-transcriptional processes
* RNA interference: discovery, mechanism of action and factors
  + microRNAs (miRNAs): biogenesis, mechanism of action and role in cell differentiation and proliferation
* long non coding RNAs (lncRNAs): nuclear and cytoplasmic species (biogenesis and function)
* circular RNAs (circR.NAs): biogenesis and function
* ncRNAs in neuro-muscle diseases
* ncRNAs in cancer
* RNA-based therapeutic approaches

***Teaching material:***

**e-learning:** http://elearning2.uniroma1.it

***Text books:***

**Molecular Biology** – 5th Edition - R.F. Weaver

or **Molecular Biology of the Gene** **–** 7th Edition **-** Watson