Postdoctoral position to investigate biological condensate organization, assembly, and functions *in vivo*.

The formation of membrane-less intracellular structures such as nucleoli, centrioles and germline granules, involves a mechanism termed condensation, which occurs via multivalent weak interactions across individual components. Condensation is typically mediated by intrinsically disordered regions (IDRs) on proteins, by short complementary sequences of nucleotides, or through nucleic-acid templated networks of associated IDR-rich proteins. This unusual mechanism provides unique properties including rapid reversibility of assembly and disassembly that underlies many of the morphological and functional features of intracellular condensates. While much is being learned about biological condensates *in vitro* and in cultured cells, understanding their mechanisms and functions in multicellular organisms remains a frontier area of biological research. Its importance is highlighted not only by its functions in animal physiology – e.g. rapid changes in metabolic states, signaling competence, transcription, cell proliferation and differentiation may be mediated by condensate dynamics – but also by their roles in diseases – e.g, viral infections, cancer or neurodegeneration.

The overall goal of a collaborative programme centered in National Centre for Biological Sciences (NCBS) in Bangalore is to understand and analyze condensate functions at both cellular and organismal levels. In this context, a position is available for a postdoctoral fellow to work on a collaborative, co-supervised project centered in Prof. K. VijayRaghavan's laboratory at NCBS. A suggested initial specific focus of the work is on homologous mRNP-condensates in *Drosophila* and mammalian cell systems, which preliminary studies suggest to have functions in controlling mRNA translation across cell types (germline cells to neurons), in cell stress and in neurodegenerative disease. The position is best suited for a person with a PhD in Life Sciences, experience in cell and molecular biology and *Drosophila* molecular genetics (including CRISPR genome engineering and confocal imaging) who is self-motivated, independent, and possesses strong oral and written scientific communication skills. The latter is critical as the work itself will be highly collaborative, potentially engaging multiple national and international laboratories.

The position is expected to start around December 2024. Initially funded for one year, it is expected that the candidate will apply for national and, if appropriate, international postdoctoral fellowships.

To apply, send a letter of motivation, a detailed CV, and contact details of three references to **neurosciencemolecular@gmail.com.** Shortlisted candidates will be contacted for an interview.

Website link for the labs involved:
Dr. Amanjot Singh
Dr. Baskar Bakthavachalu
Prof. Mani Ramaswami
Prof. K. VijayRaghavan

Relevant Publications:

- Petrauskas A, Fortunati DL, Kandi AR, Pothapragada SS, Agrawal K, Singh A, Huelsmeier J, Hillebrand J, Brown G, Chaturvedi D, Lee J, Lim C, Auburger G, VijayRaghavan K, Ramaswami M & Bakthavachalu B (2024) Structured and disordered regions of Ataxin-2

contribute differently to the specificity and efficiency of mRNP granule formation. *PLoS Genet.* 20, e1011251.

- Singh A, Hulsmeier J, Kandi AR, Pothapragada SS, Hillebrand J, Petrauskas A, Agrawal K, Krishnan RT, Thiagarajan D, Jayaprakashappa D, Vijayraghavan K, Ramaswami M & Bakthavachalu B (2021) Antagonistic roles for ataxin-2 structured and disordered domains in rnp condensation. *Elife* 10: e60326.

- Saravanan B, Soota D, Islam Z, Majumdar S, Mann R, Meel S, Farooq U, Walavalkar K, Gayen S, Singh AK, Hannenhalli S, Notani D (2020) Ligand dependent gene regulation by transient ER alpha clustered enhancers. *PLoS Genetics* 16: e1008516.

- Bakthavachalu B, Huelsmeier J, Sudhakaran IP, Hillebrand J, Singh A, Petrauskas A, Thiagarajan D, Sankaranarayanan M, Mizoue L, Anderson EN, Pandey UB, Ross E, VijayRaghavan K, Parker R & Ramaswami M (2018) RNP-Granule Assembly via Ataxin-2 Disordered Domains Is Required for Long-Term Memory and Neurodegeneration. *Neuron* 98, 754–766.

- Sudhakaran IP, Hillebrand J, Dervan A, Das S, Holohan EE, Hülsmeier J, Sarov M, Parker R, VijayRaghavan K, Ramaswami M (2014) FMRP and Ataxin-2 function together in long-term olfactory habituation and neuronal translational control. *PNAS* 111: 99-108.

- Ramaswami M, Taylor JP & Parker R (2013) Altered “Ribostasis”: RNA-protein granule formation or persistence in the development of degenerative disorders. *Cell* 154: 727-736.