

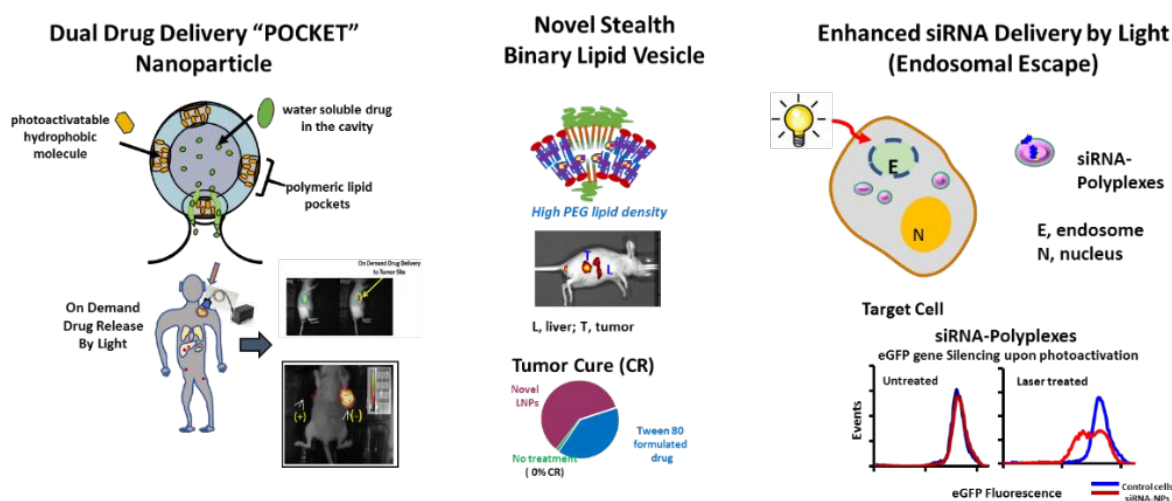
# BIOLOGY ZOOM SEMINAR

## *Lipid-based Formulations for Delivery of Drugs, RNA Therapeutics and RNA-Vaccine Development*

Speaker: Anu Puri, Ph.D.

RNA Biology Laboratory

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Lipids are an integral part of cell membranes and play a vital role in biological processes such as membrane fusion, exocytosis, cell signaling and disease progression. Uniquely defined chemical structures of lipids as well as their assembly in the aqueous environment are often known to dictate their biological activity. Some of these features

of lipids have been exploited to develop them as carriers for drugs, bioactive molecules and nucleic acids (siRNA), and recently for mRNA-based COVID-19 vaccine. Lipid-based nanocarriers usually termed as liposomes, as well as lipid vesicles, have claimed their status in the field of cancer nanomedicine. Several liposomes are currently used in the clinics for patient care, primarily to treat cancer. It is exciting to know that recently, lipids (specifically cationic in nature) have gained attention for delivery of siRNA and mRNA. With the advent of the first approved RNAi drug in 2018, the RNAi therapeutics field has taken an unprecedented turn toward intended benefit to patients. The two COVID-19 vaccines in the United States (Moderna and Pfizer) use the mRNA for the COVID-19 fusion protein. These vaccines contain a discrete set of lipids to make formulations suitable for clinical use. Despite long-sought cancer drug delivery promise and the recently developed RNA-therapeutics field, lipid-based formulations still face various bottlenecks that limit their full clinical potential. Dr. Puri will discuss challenges that need further development and allude to current approaches and future directions being pursued to tackle these problems.

Dr. Puri's research revolves around themes ranging from Biomembranes to Viruses to Nanomedicine. She is developing nanomedicine, activated by light for on-demand cargo release to improve cancer treatments. She is developing nanobiosensors for rapid detection of pathogens in patients' samples. Dr. Puri also investigates host-pathogen mechanisms using viruses. She has evaluated molecular scaffolds of viral proteins and their receptors, essential for viral infection (influenza, HIV-1 etc.). She serves as a member of the International Advisory Committee of Uttarakhand Council of Biotechnology, and NIPER-R, India. She is also pursuing research in the nanomedicine arena under the US-India Joint Working Group (JWG) on the Prevention of Sexually Transmitted Diseases and HIV/AIDS.



Monday ✦ March 8 ✦ 4 PM

