CHIKV capsid and envelope proteins results in the formation of self-assembled virus-like particles (VLPs) that have been shown to protect nonhuman primates against infection from multiple strains of CHIKV. This study describes the characterization, excipient screening, and optimization of CHIKV VLP solution conditions toward the development of a stable parenteral formulation. The CHIKV VLPs were found to be poorly soluble at pH 6 and below. Circular dichroism, intrinsic fluorescence, and static and dynamic light scattering measurements were therefore performed at neutral pH, and results consistent with the formation of molten globule structures were observed at elevated temperatures. A library of generally recognized as safe excipients was screened for their ability to physically stabilize CHIKV VLPs using a high-throughput turbidity-based assay. Sugars, sugar alcohols, and polyanions were identified as potential stabilizers and the concentrations and combinations of select excipients were optimized. The effects of polyanions were further studied, and while all polyanions tested stabilized CHIKV VLPs against aggregation, the effects of polyanions on conformational stability varied.

Kumar, V. et al. (2016). "A chromatography-free isolation of rohitukine from leaves of dysoxylum binectariferum: Evaluation for in vitro cytotoxicity, Cdk inhibition and physicochemical properties." *Bioorg Med Chem Lett* 26(15):3457–3463.

Rohitukine is a chromone alkaloid isolated from an Indian medicinal plant Dysoxylum binectariferum. This natural product has led to the discovery of two clinical candidates (flavopiridol and P276-00) for the treatment of cancer. Herein, for the first time we report an efficient protocol for isolation and purification of this precious natural product in a bulk-quantity from leaves (a renewable source) of D. binectariferum (>98% purity) without use of chromatography or any acid-base treatment. Despite of the fact that this scaffold has reached up to clinical stage, particularly for leukemia; however, the antileukemic activity of a parent natural product has never been investigated. Furthermore, rohitukine has never been studied for cyclin-dependent kinase (Cdk) inhibition, kinase profiling and for its experimental physicochemical properties. Thus, herein, we report in vitro cytotoxicity of rohitukine in a panel of 20 cancer cell lines (including leukemia, pancreatic, prostate, breast and CNS) and 2 normal cell lines; kinase profiling, Cdk2/9 inhibition, and physicochemical properties (solubility and stability in biological medias, pKa, LogP, LogD). In cytotoxicity screening, rohitukine displayed promising activity in HL-60 and Molt-4 (leukemia) cell lines with GI50 of 10 and 12 μM, respectively. It showed inhibition of Cdk2/A and Cdk9/T1 with IC50 values of 7.3 and 0.3 μM, respectively. The key interactions of rohitukine with Cdk9 was also studied by molecular modeling. Rohitukine was found to be highly water soluble (Swater = 10.3 mg/mL) and its LogP value was −0.55. The ionization constant of rohitukine was found to be 5.83. Rohitukine was stable in various biological media's including rat plasma. The data presented herein will help in designing better anticancer agents in future.

Kyadarkunte, A. Y. et al. (2015). "Cellular interactions and photoprotective effects of idebenone-loaded nanostructured lipid carriers stabilized using PEG-free surfactant." *Int J Pharm* 479(1):77–87.

In past years, nanostructured lipid carriers (NLCs) have emerged as novel topical antioxidant delivery systems because of combined positive features of liposomes and polymeric nanoparticles. Here, we seek to unlock the possibility of idebenone (IDB;