Katherine L.B. Borden, RNA metabolism is subverted in cancer: what we know and what can we do about it

RNA metabolism can be hijacked by cancer cells to re-write and/or amplify the message sent from the DNA. This in turn can underpin the oncogenic phenotype. The eukaryotic translation initiation factor eIF4E is an m^7G cap-binding protein which can escort messages through various RNA metabolism steps including translation. Indeed, it has been known since the 1990s that eIF4E is present in both the nucleus and cytoplasm of eukaryotic cells. In the nucleus, eIF4E binds ~3000 transcripts and influences multiple stages of their processing. eIF4E-targeted mRNAs can act in the same biochemical pathways whereby eIF4E coordinates biochemical responses as seen in RNA regulons. These pathways include the extracellular hyaluronan-CD44-ezrin signalling pathways. Identification of these eIF4E-targets led to the finding that eIF4E enhances cell motility in cancer cells which is consistent with its frequent association with metastatic disease. Further, clinical targeting of eIF4E in high-eIF4E AML patients leads to objective clinical responses including complete remissions corresponding to eIF4E targeting in these patients.