FALL 2022

Biochemistry and Molecular Biology Brown Bag Series

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Ph.D. Student

"Regulation of ERK3 by KRAS signaling and role of ERK3 in cell growth of NSCLC with KRAS mutation"

Tuesday, November 15, 2022

11:00 AM

135 Oelman Hall

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https://science-math.wright.edu/biochemistry-and-molecular-biology

Abstract:

Regulation of ERK3 by KRAS signaling and role of ERK3 in cell growth of NSCLC with KRAS mutation.

Extracellular signal related kinase 3 (ERK3) is one of the atypical mitogenactivated protein kinases (MAPK). It is expressed ubiquitously and plays a role in a variety of cellular processes, including cell growth and differentiation. ERK3's role in promoting migration and invasion in various cancers has been well established. ERK3 is upregulated in non-small cell lung cancers (NSCLCs) and has been shown to promote NSCLC tumor growth and progression. However, the regulation of ERK3 in lung cancers remains largely unclear. A recent study indicates that ERK3 phosphorylation at S189, an indicator of ERK3 activity, is upregulated by KRAS in NSCLCs. KRAS is one of the most frequently mutated oncogenes in lung cancers. To study the KRAS dependent regulation of ERK3, knockdown of KRAS was performed and it resulted in a remarkable reduction in phopho-ERK3 as well as total ERK3 protein level confirming the regulation of ERK3 by KRAS. Further, I found that the regulation of ERK3 by KRAS may be through the transcription factor c-Jun that is well-known to be activated by KRas/ERK1/2 signaling. Given the discrepancy in the role of ERK3 NSCLC cell growth, I have investigated the role of ERK3 in cell growth by knocking down ERK3 using different siRNAs in a variety of NSCLS cell lines with different KRas mutation status and differential dependence on KRas. To further understand the regulation of ERK3 by KRAS, cell models with KRas overexpression are to be developed and the effect of ERK3 inhibitors on the cell growth of NSCLCs with KRAS mutations are to be evaluated.