

Structural Analysis of Collapsin Response Mediator Protein-1 by Utilizing Transmission X-ray Microscopy

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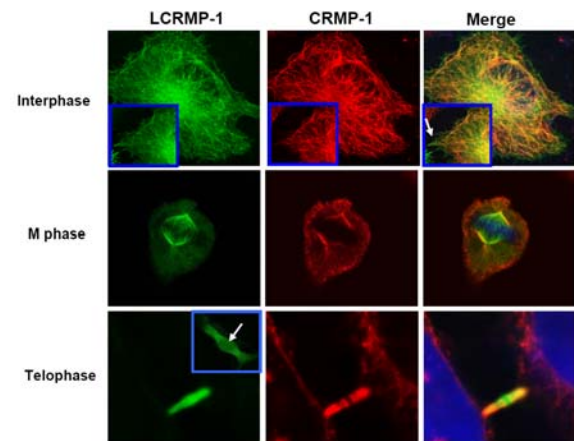
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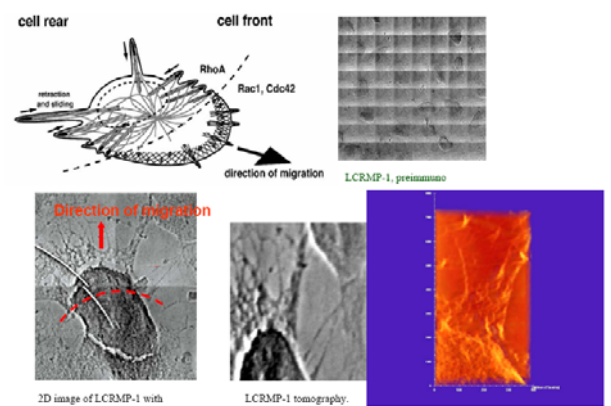
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Introduction

Tumor metastasis is a significant contributor to death in cancer patients. Despite the obvious importance of metastasis, the process remains incompletely characterized at the molecular and biochemical levels. We previously identified a novel invasion suppressor collapsin response mediator protein-1 (CRMP-1) by microarray and invasion cell line model, which can predict outcomes and metastasis in non-small cell lung cancer (NSCLC) patients. CRMP-1 is a 66 kDa cytosolic protein that can suppress cancer cell invasion through F-actin depolymerization. Recently, we further found a specific association protein with molecular size about 76 kDa is a novel subtype of CRMP-1, and we named it as LCRMP-1. The sequence alignment showed that C-terminals of LCRMP-1 and CRMP-1 were identical and the N-terminal regions were encoded by different exon-1. The LCRMP-1 proteins form a filamentous structure in cytoplasm and co-localize with CRMP-1, tubulin and actin. Further characterization revealed that LCRMP-1 is functionally antagonized with CRMP-1. The LCRMP-1 can enhance cancer cell migration and invasion, and increased in LCRMP-1/CRMP-1 expression ratio is associated with the increase of cell invasion ability. The LCRMP-1 could interact with actin and over-expression of LCRMP-1 enhanced filopodia formation. Our results suggest that LCRMP-1 is a novel invasion enhancer and functionally antagonize with CRMP-1. We utilize this nano-transmission X-ray microscope for structural analysis of the distribution of LCRMP-1 in thin film and bio-membrane. Owing to our preliminary results, we know that LCRMP-1 form filamentous structures in cell, and can control the dynamic action of F-actin polymerization. We produced specific antibodies of LCRMP-1 and conjugated immuno-nano-gold-particles into specific LCRMP-1 to detect the distribution and structure of LCRMP-1 in thin film and bio-membrane.

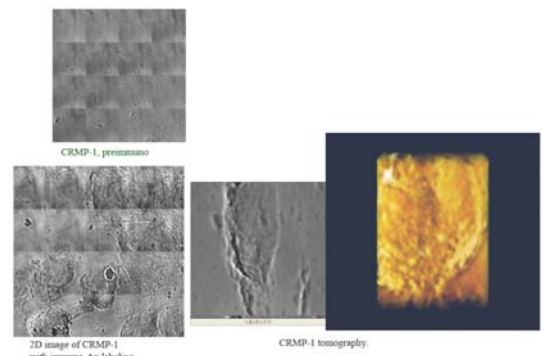


Long-form Collapsin Response Mediator Protein-1 (LCRMP-1)



The long-form collapsin response mediator protein-1 (LCRMP-1) can enhance cancer cell migration and invasion.

Collapsin Response Mediator Protein-1 (LCRMP-1)



The novel invasion suppressor collapsin response mediator protein-1 (CRMP-1) can predict outcomes and metastasis in non-small cell lung cancer (NSCLC) patients.

