

# **Nucleolar Protein BOP1 Expression, Localization, and Function in Prostate Cancer Progression**

## **Background**

Differentiating between indolent and aggressive prostate cancers (CaP) is important to decrease over-treatment and increase survival for men with aggressive disease. Nucleolar prominence is a histologic hallmark of CaP; however, the expression, localization, and functional significance of specific nucleolar proteins has not been thoroughly investigated. Nucleolar protein BOP1 has been associated with multiple cancers, but it has not been previously implicated in CaP.

## **Methods**

Meta-analysis of publicly available data was used to determine BOP1 expression changes in CaP progression, recurrence, and survival. Multiplexed immunohistochemistry was used to analyze the expression and localization of BOP1 and nucleolar marker NOP56 in human tissue samples. BOP1 functional significance was assessed in cell line models using siRNA knockdown followed by cell viability and motility assays.

## **Results**

Meta-analysis of publicly available data showed increased BOP1 expression in metastatic CaP, recurrent CaP, and was inversely associated with overall survival. In human tissue samples, increased BOP1 expression was observed at later stages of CaP progression coinciding with a localization change from nuclear to cytoplasmic. Importantly, BOP1 expression was inversely associated with overall survival in meta-analysis and patient samples. In models of prostate cancer progression, BOP1 expression showed similar expression and localization to the human patient samples. Functional significance of BOP1 in metastatic CaP was assessed by genetic knockdown, where knockdown of BOP1 resulted in decreased proliferation and motility compared to control.

## **Conclusions**

These data suggest a prognostic significance of BOP1 in CaP, where increased overall BOP1 expression concurrent with localization to the cytoplasm was associated with advanced disease and decreased survival. Functionally, BOP1 may be involved in CaP proliferation and motility, suggesting a functional role for nucleolar proteins in CaP progression.