

Modulation of the expression of different S6Ks isoforms in prostate cancer cell lines leads to alterations in proliferation, migration and chemotherapy resistance

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Abstract

Many works have demonstrated the participation of the mTOR pathway in cancer, but there is currently a demand to better characterize the S6Ks isoforms in this disease. The present work aimed to study the effects of S6Ks overexpression in cellular assays using prostate cancer cells.

Key words: mTOR, S6K, cancer

Introduction

Several studies have shown that mTOR protein acts in multiple biochemical processes involved in metabolism and cellular growth. Other studies have shown that mTOR/S6K1 pathway is related to some types of cancer. Moreover, oncogenic proteins such as Ras and PI3K/Akt present relationship with mTOR pathway. Thus, the activation of the Ras and/or PI3K/Akt signaling pathways enhance mTOR pathway and stimulate uncontrolled cell growth, characteristic of cancer cells.

The objective of this study was to evaluate effects of S6Ks overexpression in proliferation, migration, colony formation and resistance to chemotherapeutic drug of prostate cancer cells.

Results and Discussion

DU145 and PC3 prostate cell lines were used as models. The cells were transfected with plasmids carrying S6Ks genes using lipofectamine. The following methods were used: proliferation assay, scratch assay for cell migration and colony formation assays using methylene blue staining.

The results from cellular assays were:

- Overexpression of S6K1 isoforms increased migration of prostate cancer cells DU145 and PC3;
- p85-S6K1 increased proliferation of DU145 and PC3;
- p85-S6K1 increased colony formation of DU145 and PC3;
- Overexpression of S6K isoforms increases the resistance of PC3 cells with docetaxel.

These results indicate that S6Ks isoforms contribute for the growth and the survival of prostate cancer cells and may be potentially used as targets to treat this type of cancer.

Conclusions

Overexpression of S6Ks increased PC3 cells resistance to docetaxel and overexpression of p85-S6K1 isoform in prostate cancer cells increased the ability of colony formation, proliferation and migration.

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