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KSP and Aurora B as potential biomarkers and therapeutic targets for head and neck cancer

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Abstract

Background: Head and neck cancer (HNC) is the seventh most prevalent worldwide [1]. The treatment for HNC often involves a combination of modalities such as surgery, radiation therapy, and chemotherapy. However, HNC patients' survival rate has shown little improvement [2]. Treatment failures are often attributed to local recurrence, lymph node metastases, and drug resistance [3]. Hence, the need for new biomarkers which allow personalized treatments and novel therapeutic approaches arises. Proteins involved in mitosis, like KSP and Aurora B, are potential candidates. KSP is engaged in bipolar spindle formation and chromosome segregation, while Aurora B is essential for kinetochore stability and cytokinesis regulation [4,5]. Inhibiting these proteins halts mitosis and triggers cell death [6,7]. Moreover, the targeting of these proteins can potentially be used not only as monotherapy but also to improve other therapeutic approaches. **Objective:** to analyze the potential of KSP and Aurora B as biomarkers and potential treatment targets in head and neck cancer. **Methods:** Bioinformatic tools such as UALCAN, Timer 2.0 and BioGrid were used to collect and analyze data. **Results:** Both KSP and Aurora B are overexpressed in HNC patients. Nonetheless there is no statistically significant correlation between higher expression of either protein and patient survivability even though a tendency can be observed for a higher expression of KSP and a better prognosis. Furthermore, the overexpression of both proteins seems to be correlated with the expression of prosurvival proteins, such as BCL-2 and BCL-xL, and BRD4, an epigenetic activator involved in cancer development. **Conclusions:** KSP and Aurora B are overexpressed in HNC patients, but no significant correlation was found regarding patient survivability potentially making them unsuitable as biomarker candidates. However, the overexpression of both proteins is correlated with proteins involved in cancer survival and development which opens the possibility for co-targeting strategies.

Keywords: bioinformatics; head and neck cancer; biomarkers; KSP; Aurora B

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References

1. Sung, H.; Ferlay, J.; Siegel, R.L.; Laversanne, M.; Soerjomataram, I.; Jemal, A.; Bray, F. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA. Cancer J. Clin. (2021), 71, 209–249.

2. Silva, J.P.N.; Pinto, B.; Monteiro, L.; Silva, P.M.A.; Bousbaa, H. Combination Therapy as a Promising Way to Fight Oral Cancer. Pharmaceutics (2023), 15, 1653.
3. Lee, H.-M.; Patel, V.; Shyur, L.-F.; Lee, W.-L. Copper Supplementation Amplifies the Anti-Tumor Effect of Curcumin in Oral Cancer Cells. Phytomedicine (2016), 23, 1535–1544.
4. Bartoli, K.M.; Jakovljevic, J.; Woolford, J.L.; Saunders, W.S. Kinesin Molecular Motor Eg5 Functions during Polypeptide Synthesis. Mol. Biol. Cell (2011), 22, 3420–3430.
5. Portella, G.; Passaro, C.; Chieffi, P. Aurora B: A New Prognostic Marker and Therapeutic Target in Cancer. Curr. Med. Chem. (2011), 18, 482–496.
6. Roy, B.; Han, S.J.Y.; Fontan, A.N.; Jema, S.; Joglekar, A.P. Aurora B Phosphorylates Bub1 to Promote Spindle Assembly Checkpoint Signaling. Curr. Biol. (2022), 32, 237-247.e6.
7. Yu, W.-X.; Li, Y.-K.; Xu, M.-F.; Xu, C.-J.; Chen, J.; Wei, Y.-L.; She, Z.-Y. Kinesin-5 Eg5 Is Essential for Spindle Assembly, Chromosome Stability and Organogenesis in Development. Cell Death Discov. (2022), 8, 490.