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Oral Presentation

Functional Role of the K2P Potassium Channel TASK-3 in Glioma

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Abstract

TASK-3, a two-pore-domain (K2P) potassium channel, has been implicated as important regulator for the effector function and proliferation of T-cells. Interestingly, TASK-3 has also a functional impact on tumor cells. Therefore, we sought to investigate whether TASK3 modulation might have a therapeutic potential for malignant gliomas by a variety of phenotypical and functional in vitro assays mimicking tumor microenvironment such as hypoxia and an in vivo mouse model for malignant glioma. GL261 glioma cells demonstrated higher proliferation rates under hypoxia, while proliferation and viability of WT (wildtype) T-cells was significantly reduced. Of note, TASK3-/- T-cells were more resistant to hypoxia-induced anergy and cell death indicating a potential advantage in immune-mediated tumor defense. In accordance, TASK-3-/- mice demonstrated a longer symptom-free survival in the GL261 malignant glioma model compared to WT mice (31 versus 23 days). To dissect an immune-cell mediated effect, we performed an adoptive transfer of splenocytes in RAG-/- mice, which do not contain mature B- or T-cells. Transferring TASK-3-/- splenocytes, we observed prolonged symptom-free survival (21 days) compared to WT splenocytes (17 days). Therefore, our results indicate a role of TASK3 in immune-cell mediated tumor defense mechanisms providing first evidence for a new therapeutic target in glioma therapy.

Keywords: Potassium Channel, Glioma, Tumor

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