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Establishing continuous single cell cultures from primary tumor excisions using a new generation of tumor tissue transport- and culture solution

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Background: The growing interest in proteomics and genomics of patient's tumors and their complementary normal tissue demand for new strategies in cryopreservation and cell banking of the excised tumor - tissue/biopsies.
Whereas, genomics and proteomics of the non- tumoral material can be analyzed as long as the patient is available, tumor tissue is freely disposable most only prior to the first treatment. To offer the possibility of a tumor based treatment decision to all patients, the excision, transport and handling of the tissue/biopsies are crucial. Therefore, to hand over these cancer-tissue/ biopsies from any clinic to a professional institution with an expertise in cell culture and molecular biology, a simple, rugged and feasible system is needed.
Method: In this study, we examined the properties of a new oxygen enriched solution for the transport (without freezing) and storage of tumor biopsies and the culture of single cell suspensions thereof. After arriving at normal temperature (20°C; within up to 72h after operation/biopsies) the vital tumor was frozen in the new solution with a special freezing program over 60 min to - 120°C. Thereafter the tissue is stored at 170°-196°C in a "Biosafe" cryotank. On the day of analysis the tissue is thawn at 37°C in a water bath. To study the effect of the medium on DNA-and RNA- stability of the excised tumor-tissue/biopsies, comparisons to commercial available solutions RNA-Later (Qiagen, Germany) were performed.
Results: First results on viability of complete tumor tissue/biopsies (max 0.5x0.5 cm) using this new type of medium: RNA and DNA isolations from tumors stored up to 4- 6 days at room temperature and 4 weeks at 2°- 8° C in this solution could be performed successfully. In addition, it is more important that we were able to establish continuous growing single cells from these tumors (melanoma, kidney, prostate and colon carcinoma) stored in this new culture medium, which is in contrast to the storage into the Qiagen solution. Conclusion: The use of the presented new generation of culture medium for transport of the tumor-tissue/biopsies at room temperature up to 72h is feasible.
Furthermore, cryoconservation of living tumor material and single cell suspensions in this medium can be carried out, without DMSO and or HES, because the lack of crystallization. The use of this new solution will allow creating tumor banking more easily and thus offers more flexibility in tumor based therapy.

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