Prolonged Cell Viability for Mouse Implantation of Human Tumor Tissues

Rita T. Lawlor, Dea Filippini, Nicola Sperandio, Nadia Mori, Vincenza Favuzzi, Irene Dalai, Aldo Scarpa
ARC-NET APPLIED RESEARCH ON CANCER, VERONA-ITALY

INTRODUCTION
Prolonged transport time and processing delays of tissue specimens are known to affect cell vitality. The aim of this study was to test the impact of storing tissue samples under vacuum conditions prior to use for mouse implantation.

MATERIALS AND METHODS
Samples were obtained from patients who underwent surgical resection for pancreas ductal adenocarcinoma (PDAC). Samples were used from a total of 10 cases of PDAC. 80 SWISS-nu/nu mice were used for tumor implantation.

5 cases of fresh pancreas tumor tissue were cut in 3 samples: one was processed immediately (T0) and the other two were placed in a vacuum packed using Tissue Vacuum (Kaltek)® (Fig. 1) and stored refrigerated at 4°C for 24 hours (T24) and 48 hours (T48).

Each sample was then fragmented into four pieces which were implanted in two immunodeficient SWISS-nu/nu mice, one fragment in each of the nape and right flank of each mouse (Fig. 2).

Based on results of 48 hours we then successfully tested other 5 cases up to 96 hours using the same methods. Cases with larger tumor size were selected to permit 5 samples from each case to be used for the study for implanting immediately (T0), at 24 hours (T24), at 48 hours (T48), at 72 hours (T72) and at 96 hours (T96).

RESULTS
Tumor fragments implanted in the right flank of each mouse grew within 17 days of implantation (Fig 3) showing the viability of tumor tissue stored vacuum refrigerated for up 48 hours for 3 of the first 5 cases (Table 1).

Based on results of 48 hours we then successfully tested other 5 cases up to 96 hours showing the viability of tumor tissue stored vacuum refrigerated for up 96 hours (Table 2 and Fig. 4).

CONCLUSIONS
Samples can be maintained fresh for up to 96 hours and still guarantee cellular vitality. This permits the possibility to produce cell cultures even after prolonged delays from tissue sampling. Furthermore it facilitates xenograft production by maintaining cellular viability for implantation and growth. Perhaps most important of all, it provides options for long distance transport of fresh tissue with less stringent transport conditions.