ESTABLISHMENT OF SMALL CELL LUNG CANCER CELL LINES AND VALIDATION OF THEIR GROWTH CHARACTERISTICS

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Introduction: Rapidly metastasizing lung cancer is the top killer in the United States and many other countries. In 2014, there were nearly 224 210 new cases of lung cancer and 159 260 predicted mortality from the disease in the US and approximately 44 488 new registered cases of lung cancer in 2012 with 80% mortality and 5 % survival rate within 10 years of diagnosis in the UK. Lung cancer is the most prevalent type of cancer in Kazakhstan accounting for nearly 22.1% of all cancer cases. Small cell lung cancers (SCLCs) derived from the hormonal cells of the lung and classified as one of the most dedifferentiated cancers representing 10 – 15% of all lung cancers however showing extremely aggressive and rapid dissemination into various parts of the body. In this work we established SCLC cell line and characterised their growth for upcoming research purposes.

Methods: NCI-H69 is a small cell lung carcinoma line isolated from a pleural effusion from a female individual. Cell line was obtained from the American Type Culture Collection (ATCC) and mutant for p53. Cells were grown at 37oC in a humidified incubator at 5% CO2 in RPMI-1640 medium supplemented with 10% FCS, 10 U/ml penicillin, 0.1 mg/ml streptomycin and 0.5 mM glutamine. Cell lines were routinely cultured twice-weekly.

Results: Cells grow as suspension culture mostly as individual cells. As the cells divided, they formed clusters which then increased in size if left for long. Thus these clusters needed to be regularly disrupted in order to ensure rapid proliferation. Large clusters were disrupted with trypsin however resulted in slower growth phenotype. Furthermore, cells cultured long-term became partially or wholly adherent forming large aggregates that were difficult to proliferate. Finally, it was established that H69 cells were very sensitive to freezing and took considerable time to resume exponential growth upon thawing, and similarly were sensitive to cell density (therefore, not reccommended to passage these cells at dilutions greater than 1/8).

Conclusion: With attention to these issues and appropriate delicate handling it is however possible to successfully grow NCI-H69 cells so as to optimise cell proliferation.