Comparative study of L1 between lung cancer and healthy samples
Vergleichende Studie von L1 zwischen Lungenkrebs und gesunden Proben

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Introduction: LINE-1 (L1) are retrotransposons with the ability of autonomous mobilization. They are present in all human's genome and comprise the 17% of it. In somatic cells, L1 is silenced; nevertheless, a number of observations, in human cancer cells, indicate that L1 sequences become reactivated and are capable of copying themselves and mobilizing to different genomic locations, leading to rearrangements and chromosomal breaks. Literature and experimental data demonstrated that LINE-1 activity is increased in various types of cancer cells and tissues. The aim of the present study was to compare L1 copies between lung cancer samples and healthy individuals.

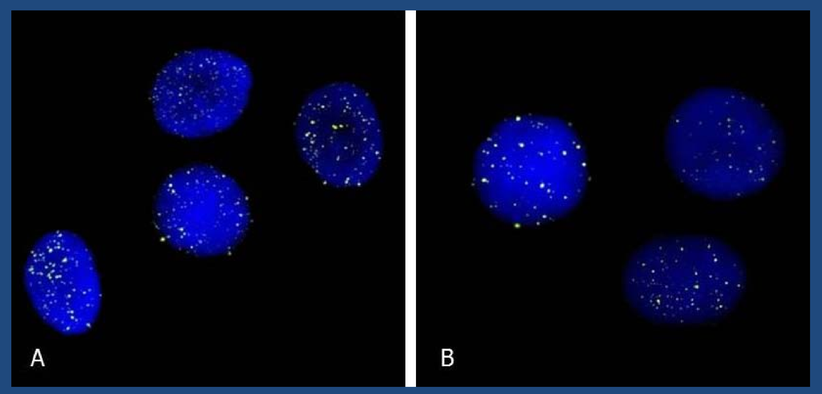

Figure 1: FISH results for L1 (green signals) in interphase nuclei from lung cancer cell lines: (A) COR-L105, (B) COLO699N

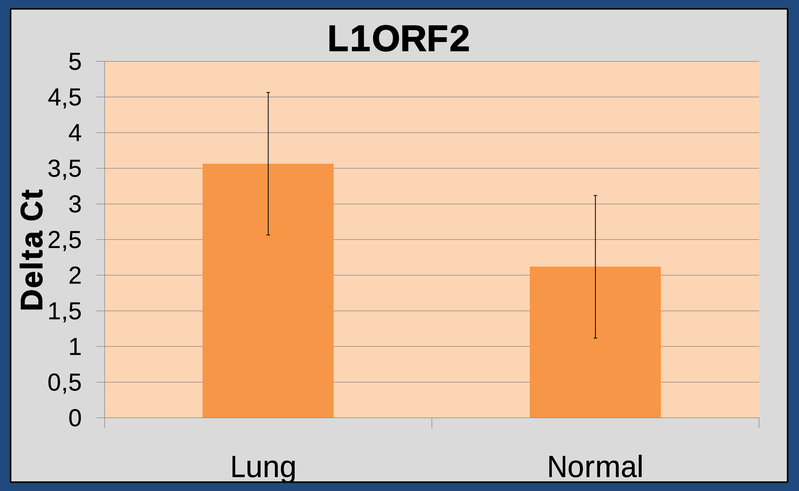

Figure 2: Gene expression of L1ORF2 between normal and lung cancer samples. 18SrRNA was used as housekeeping gene.

Materials & Methods: Cells were isolated from commercial cancer cell lines CALU-1, COR-L105 and COLO699N (provided by ECACC), representing lung cancer. PBMCs were isolated from three healthy individuals. FISH was performed with L1-ORF2 probe, which was produced with endpoint PCR and fluorescent. After DAPI staining, the slides were analyzes with Cytovision imaging software (Leica Biosystems). More than twenty nuclei of each sample were recorded. In addition, RNA was extracted and qPCR for L1-ORF2 was performed in triplicates for the above cells. Finally, statistical analysis was performed in both experimental panels ($p<0.05$ was set as significant). 18srRNA was used as housekeeping gene in qPCR reactions.

Results: FISH experiment analysis revealed that the copies of L1-ORF2 in cancer samples were higher (49,55 ± 11,2) than in normal individuals (7,1 ± 0,66). More specifically, COR-L105 gave 39±9 signals for L1, COLO699N 58,5 ± 13 and CALU-1 52,4 ± 12 signals. On the other hand the 3 healthy individuals gave 8,3 ± 0,6, 6,1 ± 0,4 and 7 ± 0,9. On the contrary, the gene expression analysis did not revealed any significant difference between the two groups that were studied.

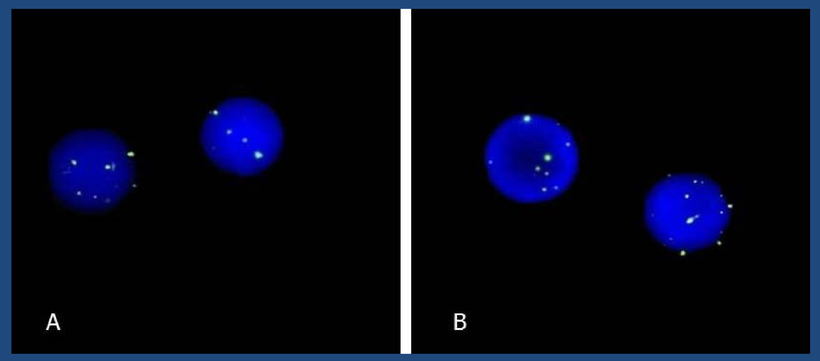

Figure 3: FISH results for L1 in interphase nuclei from normal samples: (A) female individual, (B) male individual

Conclusion: It has been proved that at genome level, the copies of L1-ORF2 are higher in cancer samples. Therefore, since it may be involved in tumorigenesis, it might be used as a potential biomarker. More samples in more cancer types need to be studied, for L1-ORF2 to be used at clinical level.

DGHO JAHRESTAGUNG 2017
Jahrestagung der Deutschen, Österreichischen und Schweizerischen Gesellschaften für Hämatologie und Medizinische Onkologie
www.haematologie-onkologie-2017.com
STUTTGART 29.9.–3.10.

Disclosure of Potential Conflicts of Interest

None of the authors of the above study has declared any conflict of interest

Selected References:

• Collier L and Largaespada D Transposable elements and the dynamic somatic genome Genome Biology 2007, 8(Suppl 1):S5
• Belancio V. et al Somatic expression of LINE-1 elements in human Tissues Nucleic Acids Research, 2010, 1–14

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