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Adaptor protein CIN85 promotes collagen adhesion and invasion of osteosarcoma cells

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Adaptor protein CIN85 was demonstrated to be involved in cancer cells adhesiveness, motility, and metastasis. However, its function in osteosarcoma (OS) remains uncharacterized. This study is **aimed** at investigation of the CIN85 effect on OS cells collagen adhesion and invasion. **Methods.** Human osteosarcoma cells HOS and SAOS-2 with CIN85 overexpression and corresponding Mock controls were used in this study. Gene expression was evaluated by RNA-seq technique and data were analyzed using online tools gprofiler, stringdb, and speed2. Adhesion was estimated by staining alive adherent cells with MTT, and collagen invasion was studied by Transwell assay. Statistical analysis was performed using Student's t-test and $p < 0,05$ was considered significant. **Results.** RNA sequencing revealed that CIN85 affects the expression of collagen-containing extracellular matrix genes (GO:0062023). Importantly, 16 of 42 genes (38%) were deregulated in highly-metastatic OS cell lines (based on the analysis of dataset GSE66673). Pathway enrichment of the genes from this category demonstrated that the TGFb, p53, and insulin-dependent genes were overrepresented. According to gene enrichment analysis, the genes involved in bone development, collagen fibril organization, blood vessel development, cell adhesion, and regulation of cell migration were altered. *In vitro* study of collagen adhesion demonstrated significantly elevated adhesiveness of CIN85-overexpressing HOS and SAOS-2 cells. In addition, CIN85 overexpression resulted in potentiation of collagen invasion through the Transwell membrane. **Conclusions.** Our results demonstrate that increased CIN85 expression in osteosarcoma cells is associated with elevated collagen adhesion and invasion and may thereby contribute to metastasis. **Funding**. This project has received funding through the MSCA4Ukraine project, which is funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the MSCA4Ukraine Consortium as a whole nor any individual member institutions of the MSCA4Ukraine Consortium can be held responsible for them.

K e y w o r d s. Osteosarcoma, CIN85, invasion, adhesion, collagen.