Background: Cancer stem cells is a small population within the tumor bulks contributing to radiotherapy and chemotherapy resistance. CD271 is reported to be a cancer stem cell markers for head and neck squamous cell carcinoma. The CD271 high population in oral and hypopharyngeal cancer is associated with treatment resistance and poor survival. We tried to explore whether CD271 is a functional cancer stem cell marker for Nasopharyngeal carcinoma (NPC).

Methods: CD271 high and low subpopulation in NPC cell lines (HONE1) is sorted by using fluorescence-activated cell sorting (FACS). Genes expression in CD271 high fraction will be examined and compared with the CD271 low counterpart using real-time quantitative PCR and immunostaining. Proliferation propensity of CD271 high and CD271 low cells will be examined using real-time monitoring xCELLigence system. Clone formation assay will be performed on parental and sorted cells. We also investigated the tumorigenic capacity of CD271 high population by monitoring tumor formation in nude mice.

Results: FACS analysis showing that cisplatin-resistant NPC had higher proportion of CD271 cells. The percentage of cells with high CD271 expression was 5.0% in parental HONE1 and 36.8% in cisplatin-resistant HONE1 cells respectively. Parental HONE1 cells with high CD271 expression counterpart exhibited higher expression level of pluripotency transcription factors (OCT4, SOX2, NANOG). CD271 high subpopulation of NPC cells also illustrated higher proliferation propensity. In colony formation assay, CD271 high population HONE1 cells showed higher colonies comparing with CD271 low counterpart.

Conclusions: CD271 expression is associated with the enhanced stemness phenotype in NPC with high tumorigenicity. The knowledge may be useful for further development of target therapeutic regime to eradicate the NPC stem cell population.