Background: Nitric oxide synthase (NOS) has been studied in many tumours. Evidences show that approximately 50% patients with pancreatic ductal adenocarcinoma (PDAC) have high expression of inducible NOS (iNOS), and iNOS expression may be involved in tumour vascularization, oxidant stress, and chemoresistance in PDAC. However, expression of endothelial NOS (eNOS) and neural NOS (nNOS) were rarely reported in the lethal disease. Here, we aimed to study the pattern of co-expression of three types NOS and their relation with perineural invasion (PNI).

Methods: Immunohistochemistry (IHC) staining method was used to measure the expression of iNOS, eNOS, and nNOS, and inhibitor of apoptosis protein (IAP) member survivin in PDAC tissue section slide from 39 patients. The patterns of three types of NOS in PDAC tissue were viewed, and its association with PNI in PDAC was analyzed.

Results: The expression rate of iNOS, eNOS and survivin protein was 62%, 57%, and 83%, respectively. The nNOS expression was not analyzed using proportions or percentages. All three NOSs protein were correlated with PNI in PDAC. The expressions of iNOS and eNOS were similar in PDAC cancer cell and nerve tissue, but the former had more extensive expression sites, such as inflammatory cells and stromal cells, and had higher expression level in the cells that invaded nerve tissue (PNI PDAC cells) than in the non-invaded type (non-PNI PDAC cells). The expression of nNOS was primarily in nerve cells and PNI PDAC cells, but was low or undetectable level in non-PNI PDAC cells and infiltrative inflammatory cells. Also, survivin was highly expressed in either non-PNI PDAC or PNI PDAC cells, and simultaneously most of infiltrative inflammatory cells expressed survivin protein.

Conclusion: The expression patterns of three types of NOS were different in PDAC cells, and their expression could be associated with PNI in PDAC.