

EXPRESSION OF THE PERIPHERAL BENZODIAZEPINE RECEPTOR mRNA IN VARIOUS HUMAN CANCER TISSUES

Nimisha H. Bhoola and Zodwa Dlamini

School of Molecular and Cell Biology, University of the Witwatersrand

Background: The Peripheral Benzodiazepine Receptor (PBR) can be classified as a distinct receptor from the central benzodiazepine receptor. The PBR gene has been located to chromosome 22q13.31 and has been found to consist of four exons, with the first and half of the fourth exon being untranslated to the PBR protein. PBR is involved in numerous biological conditions including the regulation of cellular proliferation and apoptosis, steroidogenesis, heme biosynthesis, anion and porphyrin transport and mitochondrial functions such as oxidative phosphorylation and translocation of cholesterol from the outer to the inner mitochondrial membrane. Recent studies have shown that the expression of PBR correlated with tumour malignancy and patient survival.

Aim: The objective of this research was to determine the expression pattern of PBR mRNA in various types of human cancer tissues.

Materials and Methods: Tissue arrays of multiple organs containing normal and diseased tumour tissues that were formalin-fixed were purchased from Cybrdi (U.S.A.). Sense and anti-sense RNA probes were synthesised by *in vitro* transcription and labelled with DIG. Anti-sense RNA probe complimentary to the PBR mRNA was used to localize the PBR mRNA transcript in tissue sections during colorimetric and fluorescent *in situ* hybridisation (ISH and FISH).

Results and Discussion: PBR mRNA was found to be upregulated in liver hepatocellular carcinoma, colon adenocarcinoma, epiploon squamous cell carcinoma, prostate adenocarcinoma, breast invasive ductal carcinoma, lung squamous cell carcinoma, lung adenocarcinoma, chromophobe renal cell carcinoma, brain diffuse fibrillary astrocytic carcinoma, brain ependyomas and Kaposis lymphoma when compared to its normal counterparts, However, PBR mRNA was found to be downregulated in lung small cell carcinoma when compared to its normal counterpart. In colon adenocarcinoma and liver hepatocellular carcinoma, it was found that PBR mRNA expression levels decreased as tumours become more invasive.

Conclusion: PBR mRNA is expressed in most types of human cancer tissues. Furthermore, it is highly expressed in most cancerous tissues when compared to its normal counterparts. In addition, in most cells PBR mRNA is expressed cytoplasmically, however, nuclear localization has been seen in some cells. Determination of PBR mRNA expression in the various types of cancer tissues serves as the preliminary step to future studies that will elucidate the role of PBR in the development of cancer.