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Cytochrome P450 CYP1B1 is the only known member of a recently identified sub-family of the cytochrome P450 CYP1 gene family. We have previously shown increased expression of CYP1B1 in several types of human cancer. Human CYP1B1 expressed in yeast shows high specific activity towards the 4-hydroxylation of 17β-oestradiol converting it to 4-hydroxyoestradiol, while there is significant 4-hydroxylation of oestradiol in breast cancer. In this study we have developed monoclonal antibodies to human CYP1B1 and used these antibodies to investigate the expression of CYP1B1 by immunohistochemistry in a series of primary breast cancers. The monoclonal antibodies were generated using a synthetic peptide coupled to carried protein as the immunogen. Hybridoma clones were initially screened using peptide conjugate, and positive clones were then also tested for recognition of human CYP1B1, which had been expressed in lymphoblastoid cells. The monoclonal antibodies specifically recognized CYP1B1 and the antibodies did not recognize either expressed CYP1A1 or CYP1A2. CYP1B1 was not detected in several normal tissues including liver, lung, small intestine and kidney. The monoclonal antibodies were also tested by immunohistochemistry using sections of a breast cancer, which we have previously shown to contain a high level of CYP1B1. One of the antibodies was found to be effective by immunohistochemistry on formalin-fixed, wax-embedded tissue sections and was used in the subsequent immunohistochemical studies. The majority of breast cancers showed positive immunoreactivity for CYP1B1 and CYP1B1 was specifically localized to tumour cells. The presence of CYP1B1 in breast cancer cells is likely to contribute to their metabolism of oestradiol and CYP1B1 also provides a molecular target for anticancer drugs specifically activated by this form of P450.

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