Identification of a novel cell cycle regulated gene, HURP, overexpressed in human hepatocellular carcinoma

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Abstract

An analytic strategy was followed to identify putative regulatory genes during the development of human hepatocellular carcinoma (HCC). This strategy employed a bioinformatics analysis that used a database search to identify genes, which are differentially expressed in human HCC and are also under cell cycle regulation. A novel cell cycle regulated gene (HURP) that is overexpressed in HCC was identified. Full-length cDNAs encoding the human and mouse HURP genes were isolated. They share 72 and 61% identity at the nucleotide level and amino-acid level, respectively. Endogenous levels of HURP mRNA were found to be tightly regulated during cell cycle progression as illustrated by its elevated expression in the G(2)/M phase of synchronized HeLa cells and in regenerating mouse liver after partial hepatectomy. Immunofluorescence studies revealed that hepatoma up-regulated protein (HURP) localizes to the spindle poles during mitosis. Overexpression of HURP in 293T cells resulted in an enhanced cell growth at low serum levels and at polyhema-based, anchorage-independent growth assay. Taken together, these results strongly suggest that HURP is a potential novel cell cycle regulator that may play a role in the carcinogenesis of human cancer cells.