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Generation of a transgenic zebrafish line suitable for in vivo imaging of apoptosis in liver

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It is important to develop alternative animal models suitable for in vivo imaging of apoptosis in the liver related to various diseases and drugs. In this study, we developed a transgenic zebrafish line which makes it possible to visualize apoptosis in the liver using in vivo fluorescence imaging. We constructed a transposon vector in which the promoter sequence of phosphoenolpyruvate carboxykinase 1 (pck1) followed by the coding sequences of TagGFP, a recognition motif of caspase cleavages for caspase 3, and TagRFP (Casper3-GR) were placed between the transposon-specific terminal inverted repeat sequences. The promoter sequence of pck1 was used to selectively express the downstream genes in zebrafish liver. When caspase 3 is not activated, TagGFP and TagRFP are connected by the recognition motif. In this situation, the excitation of TagGFP causes the emission of TagRFP based on fluorescence resonance energy transfer (FRET). If caspase 3 is activated, TagGFP is dissociated from TagRFP due to the cutting of the recognition motif. In that situation, the excitation of TagGFP causes the emission of TagGFP. We microinjected the transposon vector and transposase mRNA into zebrafish embryos and established a transgenic line expressing Casper3-GR in the liver. In this presentation, we demonstrate the validity of the transgenic zebrafish line in the assessment of apoptosis related to drug-induced liver injury.