An in vitro characterization study of new near infrared dyes for molecular imaging.

The spectroscopic properties, stability, and cytotoxicity of series of cyanine labels, the dyes DY-681, DY-731, DY-751, and DY-776, were studied to identify new tools for in vivo fluorescence imaging and to find substitutes for DY-676 recently used by us as fluorescent label in a target-specific probe directed against carcinoembryonic antigen (CEA). This probe enables the selective monitoring of CEA-expressing tumor cells in mice, yet displays only a low fluorescence quantum yield and thus, a non-optimum sensitivity. All the DY dyes revealed enhanced fluorescence quantum yields, a superior stability, and a lower cytotoxicity in comparison to clinically approved indocyanine green (ICG). With DY-681 and far-red excitable DY-731 and DY-751, we identified three dyes with improved properties compared to DY-676 and ICG.