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Fluorescence discrimination of cancer from inflammation by molecular response to COX-2 enzymes

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Accurate identification of cancer from inflammation and normal tissue in a rapid, sensitive and quantitative fashion is important for cancer diagnosis and resection during surgery. Here we report the use of cyclooxygenase-2 as a marker for identification of cancer from inflammation and the design of a novel smart COX-2-specific fluorogenic probe (NANQ-IMC6). The probe's fluorescence is "turned on" in both inflammations and cancers where COX-2 is over-expressed. Intriguingly, the fluorescent emission is quite different at these two sites with different expression level of COX-2. Hence, NANQ-IMC6 can not only distinguish normal cells/tissues from cancer cells/tissues, but also distinguish the latter from sites of inflammation lesions by the different fluorescence recognition of NANQ-IMC6 for COX-2 enzymes. Following spraying with the NANQ-IMC6 solution, cancerous tissue, inflamed tissues and normal tissues can be accurately discriminated *in vivo* by the unaided eye using a handheld ultraviolet lamp emitting at 365 nm. So the probe may have potential application varying from cancer-inflammation diagnosis to guiding tu mor resection during surgery.

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