



## Optically stimulated luminescence (OSL) of tooth enamel for potential use in post-exposure triage

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An assessment by the Joint Interagency Working Group (JIWG) of the current status of retrospective evaluation of radiation exposure to populations following a radiological or nuclear event highlights the need for new technologies to rapidly triage potential radiation casualties (JIWG, 2005). Notably, the need for biodosimetric methods for estimating radiation exposure to individuals is highlighted. One such potential method is to use optically stimulated luminescence (OSL) from teeth for rapid *in-vivo* dose assessments. We describe in this report progress at Oklahoma State University on the development of methods and instrumentation for *in-vivo* OSL dosimetry of irradiated teeth. The two main areas investigated were: (a) basic OSL properties of human teeth, including stimulation, minimum measurable doses, reproducibility and OSL stability; and (b) development of an instrument for potential *in-vivo* analysis of OSL from human subjects. Following the conclusions we discuss the potential for future research and development. Several OSL measurement modes were investigated and the experiments show that, under optimized conditions, human tooth enamel does emit a measureable optically stimulated luminescence signal after irradiation with doses as small as 2–5 Gy. Although, with the methods used so far, the minimum detectable doses do not yet satisfy the dose requirements for retrospective biophysical radiation dosimetry, the results hold significant promise. In parallel with method development we have also designed and built a prototype portable OSL reader for potential use *in vivo* with human teeth. The OSL instrument will be described and its performance discussed.