

## OPTICALLY STIMULATED LUMINESCENCE (OSL) OF TOOTH ENAMEL AND ITS 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 biodosimetric methods to rapidly triage potential radiation casualties [1]. One such potential method is to use optically stimulated luminescence (OSL) from teeth for rapid *in-vivo* dose assessments. We describe in this presentation progress at Oklahoma State University on the development of methods and instrumentation for *in-vivo* OSL dosimetry of irradiated teeth. We investigated basic OSL properties of human teeth and developed an instrument for potential *in-vivo* analysis of OSL from human subjects.

Experiments show that human tooth enamel does emit a measureable optically stimulated luminescence signal after irradiation with doses as small as 2-5 Gy and holds significant promise for potential use in post-exposure triage. The low signal intensities involved, however, pose the greatest challenge in satisfying the dose requirements for retrospective biophysical radiation dosimetry. OSL measurement modes investigated include different stimulation wavelengths and procedures as well as emission windows. Also tested were noise reduction techniques with the instrumentation to optimize signal-to-noise parameters.

Triage situations will require rapid and simple procedures. The goal must be a procedure that can be applied without the need for extensive individual calibration of each tooth. Using multiple human tooth samples we investigated therefore the variability of OSL properties such as sensitivity and signal fading.

[1] Joint Interagency Working Group (JIWG), 2005. Technology assessment and roadmap for Emergency Radiation Dose Assessment Program. UCRL-TR-215887, Department of Homeland Security