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Power dependent study of kinetics of TRF2 recruitment in cells due to DNA damage caused by ultrafast near-IR Laser
MANAS BHALERAO, UT Arlington, NAZMUL HUDA, DAVID GILLEY, IUPUI, SAMARENDRA MOHANTY, UT Arlington — Ultrafast laser microbeam is finding widespread applications in eliciting highly localized damage to cellular components allowing study of in-situ repair machinery. While the high peak power density that exists in ultrafast laser can cause various types of DNA damage including double strand breaks (DSB), tuning the power of these laser microbeams may cause specific type of DNA damage. Here, we report wavelength and dose dependent parametric study of kinetics of TRF2 recruitment in cells due to DNA damage caused by ultrafast near-IR Laser. A tunable Ti: Sapphire laser beam was coupled via laser port of an inverted microscope. Spot and line laser micro-irradiation pattern in nuclear sites of HT1080 cells expressing YFP-tagged TRF2 was achieved by piezo-scanning mechanism. The recruitment of TRF2-YFP was found to depend highly on the peak irradiance of the near-IR laser microbeam, the required threshold irradiance being much higher than that observed for DSB. Further, recruitment kinetics revealed that the time constant for TRF2 recruitment depends on the laser irradiance parameters. The time required for TRF2 recruitment was found to decrease with increased peak irradiance. We will present these results and also elucidate on physical mechanism of DNA damage caused by ultrafast laser microbeam.

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