

Biomedical systematic and emerging technological study on human malignant and benign cancer cells and tissues biospectroscopic analysis under synchrotron radiation

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In the current study, we have experimentally and comparatively investigated and compared malignant human cancer cells and tissues before and after irradiating of synchrotron radiation using Small-Angle X-Ray Scattering (SAXS), Ultra-Small Angle X-Ray Scattering (USAXS), Fluctuation X-Ray Scattering (FXS), Wide-Angle X-Ray Scattering (WAXS), Grazing-Incidence Small-Angle X-Ray Scattering (GISAXS), Grazing-Incidence Wide-Angle X-Ray Scattering (GIWAXS), Small-Angle Neutron Scattering (SANS), Grazing-Incidence Small-Angle Neutron Scattering (GISANS), X-Ray Diffraction (XRD), Powder X-Ray Diffraction (PXRD), Wide-Angle X-Ray Diffraction (WAXD), Grazing-Incidence X-Ray Diffraction (GIXD) and Energy-Dispersive X-Ray Diffraction (EDXRD). It is clear that malignant human cancer cells and tissues have gradually transformed to benign human cancer cells and tissues under synchrotron radiation with the passing of time (Figures 1-13) [1-170].

It can be concluded that malignant human cancer cells and tissues have gradually transformed to benign human cancer cells and tissues under synchrotron radiation with the passing of time (Figures 1-13) [1-170].

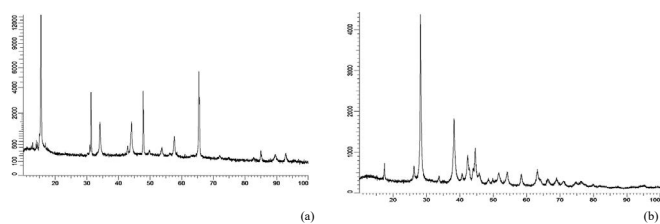


Figure 1. Small-Angle X-Ray Scattering (SAXS) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passing of time [1-170]

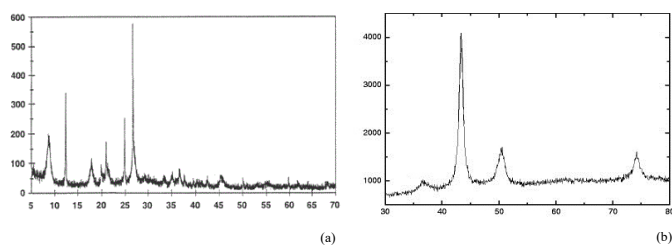


Figure 2. Ultra-Small Angle X-Ray Scattering (USAXS) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passing of time [1-170]

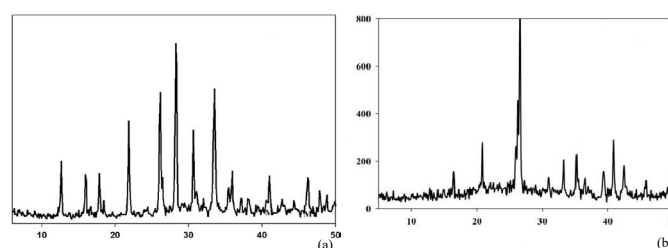


Figure 3. Fluctuation X-Ray Scattering (FXS) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passing of time [1-170]

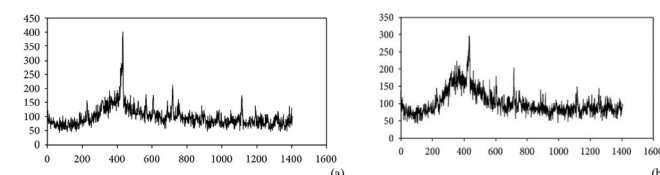


Figure 4. Wide-Angle X-Ray Scattering (WAXS) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passing of time [1-170]

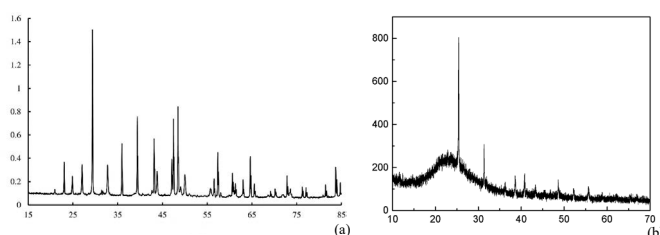


Figure 5. Grazing-Incidence Small-Angle X-Ray Scattering (GISAXS) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passing of time [1-170]

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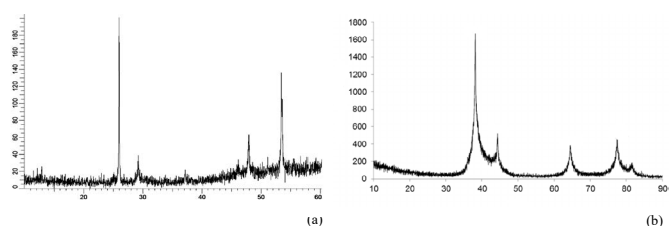


Figure 6. Grazing-Incidence Wide-Angle X-Ray Scattering (GIWAXS) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passing of time [1-170]

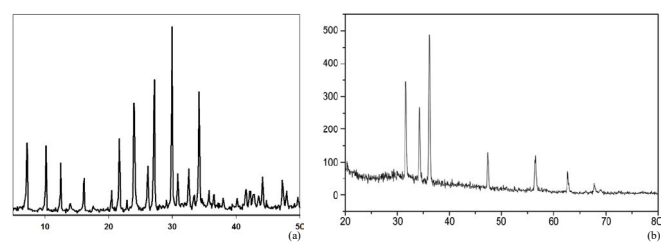


Figure 7. Small-Angle Neutron Scattering (SANS) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passing of time [1-170]

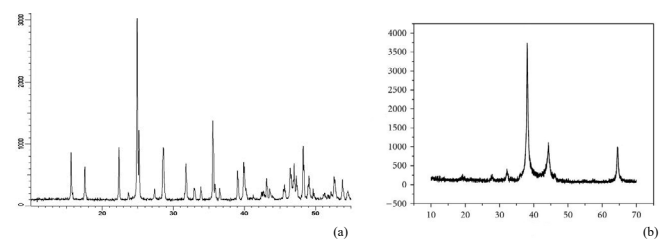


Figure 8. Grazing-Incidence Small-Angle Neutron Scattering (GISANS) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passing of time [1-170]

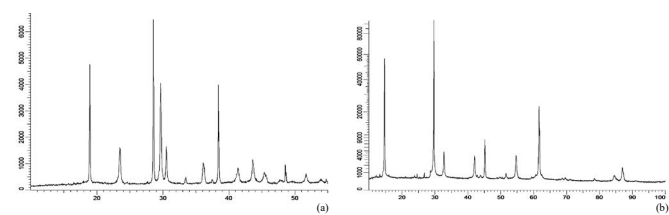


Figure 9. X-Ray Diffraction (XRD) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passing of time [1-170]

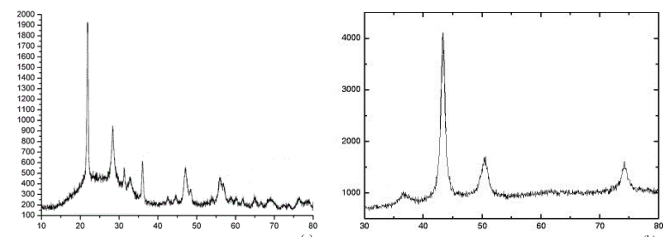


Figure 10. Powder X-Ray Diffraction (PXRD) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passing of time [1-170]

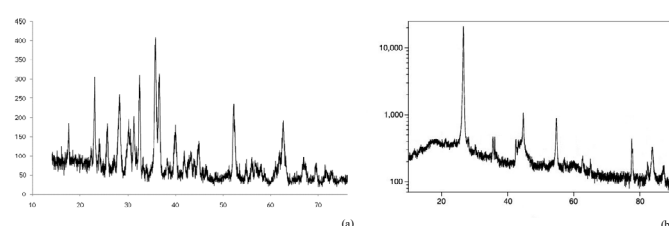


Figure 11. Wide-Angle X-Ray Diffraction (WAXD) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passing of time [1-170]

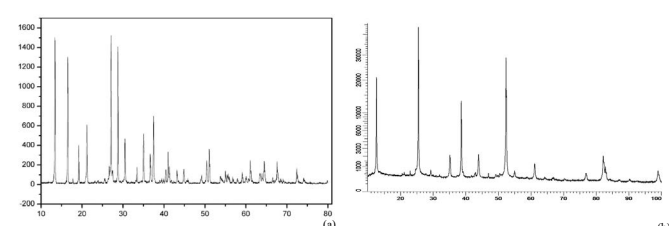


Figure 12. Grazing-Incidence X-Ray Diffraction (GIXD) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passing of time [1-170]

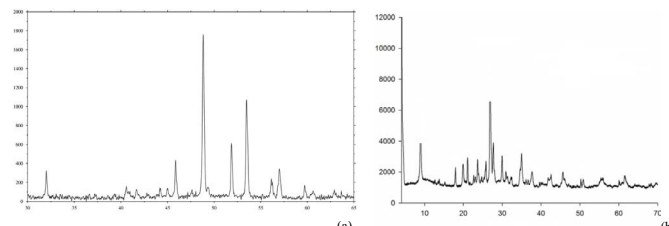


Figure 13. Energy-Dispersive X-Ray Diffraction (EDXRD) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passing of time [1-170]

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