Cancer Surgery

Short Communication Open Access

Redox Signaling in Cell Response to Radiotherapy

Yong Xu

Nanjing Medical University Affiliated Cancer Hospital, China

Radiation therapy is a treatment for cancer and, less commonly, thyroid disease, blood disorders, and noncancerous growths. radiation for cancer at different stages. In the early stages, radiation therapy can help reduce the size of a tumor before surgery or kill remaining cancer cells afterward. In the later stages, it may help relieve pain as part of palliative care.One form of radiation treatment involves using a machine that produces a beam of radiation. The beam targets a specific area of the body. Another type involves putting a radioactive substance inside the body, either permanently or temporarily.adiation therapy uses waves of energy, such as light or heat, to treat cancers and other tumors and conditions. The form of radiation used in cancer therapy is a high-energy type known as ionizing radiation. Scientists still do not know exactly how radiation works as a treatment for cancer. They do know, however, that it breaks up the DNA of cancer cells in a way that disrupts their growth and division. In this way, radiation can kill cancer cells, preventing or slowing the spread of the disease.doctor prescribes radiation therapy alone, but usually, they recommend it in combination with other treatments, such as chemotherapy, surgery, or both. Radiation can affect healthy cells as well as cancerous ones. When this happens, a person experiences side effects.Specific side effects depend on factors such as:the area receiving treatment, the person's overall health the type and doses of radiationLong term side effects also depend on the treatment site.They include:heart or lung problems, if radiation affects the chest, thyroid problems, leading to hormonal changes, if radiation affects the neck area, lymphedema, which involves lymph fluid building up and causing pain, hormonal changes, including a possibility of early menopause, from radiation in the pelvic area. There is a slight chance that high doses of radiation in certain areas can increase the risk of another form of cancer developingRadiation therapy is a treatment for cancer and, less commonly, thyroid disease, blood disorders, and noncancerous growths.A doctor may recommend radiation for cancer at different stages. In the early stages, radiation therapy can help reduce the size of a tumor before surgery or kill remaining cancer cells afterward. In the later stages, it may help relieve pain as part of palliative care. One form of radiation treatment involves using a machine that produces a beam of radiation. The beamtargets a specific area of the body. Another type involves putting a radioactive substance inside the body, either permanently or temporarily.Technicians administer external beam radiation therapy using a linear accelerator.Radiation therapy uses waves of energy, such as light or heat, to treat cancers and other tumors and conditions. The form of radiation used in cancer therapy is a high-energy type known as ionizing radiation.Scientists still do not know exactly how radiation works as a treatment for cancer. They do know, however, that it breaks up the DNA of cancer cells in a way that disrupts their growth and division. In this way, radiation can kill cancer cells, preventing or slowing the spread of the disease.Sometimes a doctor prescribes radiation therapy alone, but usually, they recommend it in combination with other treatments, such as chemotherapy, surgery, or both. There are many types of cancer. Radiation can affect healthy cells as well as cancerous ones. When this happens, a person experiences side effects. Specific side effects depend on factors such as: the area receiving treatment, the person's overall health, the type and doses of radiationShort term side effects radiation therapy include fatigue, skin changes, and nausea.Short term side effects vary, depending on the part of the body receiving radiation.They can include: fatigue, hair loss,diarrhea , skin changes, nausea and vomitingA 2018 study published in BMJ Open recommends screening for anxiety and depression in people undergoing radiation therapy and offering counseling services to those who may benefit from them.Long term side effects also depend on the treatment site.They include:heart or lung problems, if radiation affects the chest, thyroid problems, leading to hormonal changes, if radiation affects the neck area, lymphedema, which involves lymph fluid building up and causing pain, hormonal changes, including a possibility of early menopause, from radiation in the pelvic area, There is a slight chance that high doses of radiation in certain areas can increase the risk of another form of cancer developing. A doctor will provide more specific information and help with weighing the risks and benefits.Not everyone who has radiation therapy experiences long term side effects. The risk depends on the doses, the area of treatment, and other individual factors. Radiation therapy can help shrink tumors and kill cancerous cells in the early stages.This kind of treatment, in combination with other appropriate therapies, can cause cancer to go into remission. In many cases, it does not come back again. Radiation therapy can also help treat symptoms when cancer has spread widely. At this point, the radiation is part of palliative care, which aims to relieve a person's symptoms and improve

Note: This work is partially presented at Joint Event on International Conference on CANCER THERAPY & International Conference on VACCINES & VACCINATION on Redox Signaling in Cell Response to Radiotherapy during July 23-24, 2018 at Osaka, Japan

their quality of life. It may also extend a person's life, in some cases.Palliative radiation treatment usually involves lower doses and fewer treatment sessions than curative treatment. Redox signaling plays important roles in both normal physiological development and abnormal pathological progression. Malignant tumor cells generally produce the high levels of ROS due to the high rates of metabolism, as well as anticancer treatment like radiotherapy specially generates massive ROS. Virtually, ROS stress-evoked upregulation of antioxidant enzymes through NF-κB and Nrf2 protective pathways, leading to therapeutic resistance and tumor relapse. Several therapeutic approaches were tested to enhance radiotherapeutic efficiency for advanced prostate cancer by targeting the RelB-activated NF-κB alternative pathway as well as the Keap1-Nrf2 pathway. In particular, natural compounds such as parthenolide and vitamin C selectively sensitize cancer cells to radiation by inhibition of cellular antioxidant defense system, but protect the normal cells from radiotoxicity through adaptive activation of cellular antioxidant defense system. The selectivity of radiotherapeutic effects on cancer cell and normal cell survivals are mediated by differentially modulating cellular redox homeostasis. These results demonstrated that ROS mediates the disparate effects for both cell survival and cell death, suggesting that the regulation of ROS function determines the cell fate.

Note: This work is partially presented at Joint Event on International Conference on CANCER THERAPY & International Conference on VACCINES & VACCINATION on Redox Signaling in Cell Response to Radiotherapy during July 23-24, 2018 at Osaka, Japan