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Cell recycling protects tumor cells from anti-cancer therapy

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Cells have their own recycling system: Discarded cellular components, from individual proteins through to whole cellular organs, are degraded and the building blocks re-used in a different place. The scientific term for this recycling process is autophagy. In severely damaged cells, autophagy can also be a form of programmed cell death. In this case, the cell uses the mechanism for complete self-decomposition.

Cancer cells, too, make use of autophagy – especially after radiation or chemotherapy. However, why autophagy is activated in this context, is not clear. It is possible that the process contributes to the death of the treated tumor cells. But autophagy might also be an attempt by the cells to survive. “Autophagy is also switched on specifically, for example, when the cell does not have enough nutrients at its disposal,” explains Professor Ingrid Herr, head of the Research Group “Molecular OncoSurgery” of the German Cancer Research Center.

Working together with Dr. Anja Apel and scientists of the University of Tübingen, Ingrid Herr has studied the role of autophagy in cancer treatment. To this end, the investigators switched off a number of genes in tumor cells that are essential for autophagy.

Subsequently, they irradiated the cells and then examined how many cells had survived the treatment. They found out that cells that had been almost completely resistant to radiation became more sensitive to radiotherapy due to blocked autophagy. No effect was found on cancer cells that had already responded well to radiotherapy before.

Therefore, the researchers assume that highly aggressive cancer cells use autophagy to resist tumor therapy. The Heidelberg researchers will now investigate whether blocking the recycling system might be useful to support anti-cancer therapies.

Source: Helmholtz Association of German Research Centres