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Estrogen Receptor Alpha and Antioxidants in Papillary Thyroid Cancer

George G Chen*, Sangsang Wang, Lingbin Xue, Dahau Fan, Mingyue Li, Alexander C Vlantis, Jason Chan, Siu Kwan Ng, Shirley YW Liu, Enders KW Ng, C Andrew van Hasselt and Michael CF Tong

The Chinese University of Hong Kong, Prince of Wales Hospital, China

The incidence of papillary thyroid cancer (PTC) is dominant in female, suggesting a role of sex hormones in its development. Increasing data have shown that estrogen receptor alpha (ERa) has a positive role in the growth/progression of PTC. Antioxidants are a buffering system to control the activity/level of reactive oxygen species (ROS), the role of which is debatable in PTC. The relationship between ERa and ROS remains elusive in PTC. In this study, we confirmed that the expression of ERa was increased in PTC tissue samples, compared with non-tumor thyroid tissues and that estrogen (E2) treatment could significantly stimulate the expression of ERa. We demonstrated that E2-mediated ERa elevation accompanied the upregulation of intracellular ROS measured by the oxidation-sensitive probe DCFH-DA. Furthermore, we found that the level of antioxidants including manganese superoxide dismutase (MnSOD), thioredoxin reductase 2 (TXNRD2), glutathione (GSH) and glutathione peroxidase (Gpx) were increased in PTC tissue samples. In cell cultures, PTC cells treated with hydrogen peroxide (H₂O₂), a well-known source of ROS, markedly upregulated the levels of antioxidants. Since antioxidants functions to control the levels of ROS, thus our findings suggest that the upregulation of antioxidants is likely a defensive deployment against the surge of ROS.

Conclusion and Significance:

PTC is associated with ERa upregulation as well as the increase of ROS. The upregulation of ERa can trigger the production of ROS, which is balanced by antioxidants to maintain the survival and growth of PTC. (This study was supported by a grant from the Research Grants Council of the Hong Kong Special Administrative Region: 14109716).

Biography:

Dr. George G Chen is a professor in the Department of Surgery, Director of Surgical Laboratories, Faculty of Medicine at the Chinese University of Hong Kong, China. He has extensive experience in cancer research. He has authored or co-authored more than 220 papers and has written a number of books or book chapters, with Web of Science Core Collection h-index: 33 and Google Scholar h-index: 41.