

## Chloroquine and its analogs: A new promise of an old drug in cancer therapy

**Hoyun Lee**

Northeast Cancer Center, Canada

Chloroquine (CQ), N<sup>1</sup>-(7-chloroquinolin-4-yl)-N,N-diethyl-pentane-1,4-diamine, is widely used as an effective and safe agent to treat malaria, rheumatoid arthritis, lupus erythematosus and amoebic hepatitis. Although CQ was discovered 1934, it was ignored for a decade because it was considered too toxic to use in humans. CQ was “re-discovered” during World War II in the United States in the course of anti-malarial drug development. Since then, CQ remains the drug of choice for malarial treatment because it is effective and well-tolerated by humans. More recently, CQ has been “discovered” again as an enhancing agent in cancer therapies. We and others found that CQ can effectively sensitize cell killing by ionizing radiation and chemotherapeutics in a cancer-specific manner. We then created many CQ analogs and examined their efficacy and safety, alone or in combination with other cancer therapeutics. We found that combinations of Akt inhibitors and CQ/CQ derivatives greatly enhanced cell-killing effective. Importantly, this cell-killing effect by CQ/CQ derivatives is mostly cancer-specific. For example, a combination of an Akt ½ inhibitor with a CQ derivative could kill cancer cells 120-fold more effectively than non-cancer cells. We found that most of the CQ derivatives retained the lysosomotropic property like CQ, although some showed only weak affinity to lysosome. We also found that some of the derivatives we created effectively induce cell cycle arrest and activate apoptosis in a cancer-specific manner. Taken together, CQ and its analogs can dramatically enhance the efficacy of conventional cancer therapies with minimum side effects.

### Biography

Hoyun Lee obtained his PhD from the University of Guelph (Canada), and trained further as a postdoctoral fellow at the University of Virginia Medical School. He is currently the Chair of the Northeastern Ontario Cancer Therapeutics Research Initiative at Northeast Cancer Centre, Health Sciences North (Canada). He is also a Full professor at the Northern Ontario School of Medicine and the University of Ottawa Medical School (Canada). He has published more than 50 papers in reputed journals and serving as an editorial board member for three scientific journals.

hlee@hsnsudbury.ca