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## Role of active species formed by electrolysis on Electrochemical therapy

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The efficacy of the Electrochemical Therapy (EchT) is known since the middle 80's after the work of the Swedish radiologist Bjorn Nordenstrom. This therapy is currently used, mainly in China for cancer patient not suitable for surgery or when radio and chemotherapy are not effective.

In EchT, electrodes are introduced inside the tumor or in it's surrounding and a current is applied for a given time. Electric current in the range of 80–180 mA (8 to 12 V) and a total charge of about 100 C per 1 cm of tumor mass diameter are typically used.

After the treatment is observed important edema, in the cathode region, resulting in the obstruction of microcirculation and in the anode area coagulation and embolism in blood vessels as well as accumulation of white blood cells and T lymphocytes [1].

The EchT action is associated to biological effects that result from the damages produced on proteins structure, or from the increase of the permeability of the tumor cells membrane as well as from the stimulation of the organism's immune system by the fragments of tumor cells produced. These effects may be a direct consequence of the current that flows across the tumor tissue and/or of the action of the products formed during electrolysis [2].

In the present study is reported our results concerning the formation of HClO and its action using *Saccharomyces cerevisiae* as cellular model. The effect of electrochemical variables on the extent of production of HClO is analysed and results are correlated with cell viability studies.

[1] authors, journal, year, volume, pages (for an article)

[2] authors, title, year, patent number (for a patent)

[3] authors, title, year, edition, year, editor, city, country (for a book)  
(Calibri 8)

### Examples:

[1] A Damásio, AS Vieira, T Taveira and J Mourinho, Port Electrochem Acta, 2011, 23, 1713-26

[2] JV Pinto, C Ronaldo and P Futre, Cold-fusion using a pencil, 2011, Patent PT234261

[3] RB Pinheiro and Q Roscas, The marvelous of electrons and other stuff, 2011, 2<sup>nd</sup> edition, 2011, Porto Editora, Porto, Portugal