

[Search](#)

or

[Discover by subject area](#)[Recruit researchers](#)[Join for free](#)[Login](#)

Advertisement

[Home](#) > [Halogens](#) > [Chemistry](#) > [Chlorine](#)

Preprint

Chlorine dioxide solution in metastatic incurable cancer: case series

May 2023

DOI:10.22541/au.168503521.10282552/v1

Authors:

**Manuel Aparicio-Alonso**
Centro Médico Jurica**Laurent Schwartz**
Assistance Publique – Hôpitaux de Paris**Verónica Torres-Solórzano**
Autonomous University of Queretaro

Preprints and early-stage research may not have been peer reviewed yet.

[Request file](#)[Download citation](#)[Copy link](#)

To read the file of this research, you can request a copy directly from the authors.

[References \(63\)](#)

Abstract

Immunotherapy has recently yielded tremendous progress in the fight against malignancies. Its precise mechanism of action remains controversial. Activated leukocytes release reactive oxygen species which kill cancer cells. In the body, chlorine dioxide, orally ingested degrades into free radicals such as found in neutrophils. Chlorine dioxide is a potent oxidant with in vitro anticancer activity. Its precise mechanism of action has not been thoroughly explored, but it is proposed that it acts through the redox imbalance of cancer cells. Six patients were treated for metastatic cancer (breast, kidney, prostate, lymphoma, uterus and melanoma), on a compassionate basis. We report lasting tumor response with a combination of oral, enema and/or intravenous chlorine dioxide, without any side effects. This preliminary work suggest that chlorine dioxide and free radicals might be the mediators for immunotherapies. Chlorine dioxide is both a promising and unexpensive anticancer agent. Rigorous clinical trials are needed to confirm these preliminary results. Keywords : Chlorine dioxide , cancer, immunotherapy, Warburg effect, reactive oxygen species, intermittent fasting, ketogenic diet.

Discover the world's research

- 25+ million members
- 160+ million publication pages
- 2.3+ billion citations

[Join for free](#)

Advertisement



AHF analysentechnik AG

**Good for Accuracy in ICP-MS/OES**

High-quality components in various designs and materials for the sample introduction system of ICP instruments.

[Learn more](#)

Advertisement



Sponsored videos

No file available



To read the file of this research,
you can request a copy directly from the authors.

Request file PDF

Citations (0)

References (63)

Case Report: Compassionate application of chlorine dioxide-based solution in a patient with metastatic prostate cancer

Article [Full-text available](#)

Jan 2024

Verónica Torres-Solórzano · Manuel Aparicio-Alonso

[View](#) [Show abstract](#)**The Anticancer Potential of Chlorine Dioxide in Small-Cell Lung Cancer Cells**Article [Full-text available](#)

Oct 2022

● Salih Zeki Yildiz · ● Cemil Bilir · ● Gamze Guney Eskiler · Filiz Bilir

[View](#) [Show abstract](#)**The chlorine dioxide controversy: A deadly poison or a cure for COVID-19?**Article [Full-text available](#)

Sep 2021

● Mitchell Liester

[View](#) [Show abstract](#)**COVID19 Long Term Effects in Patients Treated with Chlorine Dioxide**Article [Full-text available](#)

Aug 2021

● Manuel Aparicio-Alonso

[View](#) [Show abstract](#)**Intermittent fasting in the prevention and treatment of cancer**Article [Full-text available](#)

Aug 2021

Katherine Clifton · ● Cynthia Ma · Lindsay L. Peterson · Luigi Fontana

[View](#) [Show abstract](#)**A Retrospective Observational Study of Chlorine Dioxide Effectiveness to Covid19-like Symptoms Prophylaxis in Relatives Living with COVID19 Patients**Article [Full-text available](#)

Aug 2021

● Manuel Aparicio-Alonso

[View](#) [Show abstract](#)**Hypochlorous acid selectively promotes toxicity and the expression of danger signals in human abdominal cancer cells**Article [Full-text available](#)

Mar 2021

● Eric Freund · Lea Miebach · ● Matthias B Stope · ● Sander Bekeschus

[View](#) [Show abstract](#)**Magnesium in Aging, Health and Diseases**Article [Full-text available](#)

Jan 2021

● Mario Barbagallo · ● Nicola Veronese · ● Ligia Dominguez

[View](#) [Show abstract](#)

Utilization of redox modulating small molecules that selectively act as pro-oxidants in cancer cells to open a therapeutic window for improving cancer therapyArticle [Full-text available](#)

Jan 2021

● Michael S. Petronek · Jeffrey M. Stolwijk · S.D. Murray · ● Bryan G Allen

[View](#) [Show abstract](#)**Oxidative Stress-Inducing Anticancer Therapies: Taking a Closer Look at Their Immunomodulating Effects**Article [Full-text available](#)

Dec 2020

● Jinthe Van Loenhout · ● Marc Peeters · ● Annemie Bogaerts · ● Christophe Deben

[View](#) [Show abstract](#)**Comparative study of hyperpure chlorine dioxide with two other irrigants regarding the viability of periodontal ligament stem cells**Article [Full-text available](#)

May 2021 · CLIN ORAL INVEST

● Orsolya Lang · ● Krisztina Nagy · ● Julia Lang · ● Laszlo Kohidai

[View](#) [Show abstract](#)**Can chlorine dioxide prevent the spreading of coronavirus or other viral infections? Medical hypotheses**Article [Full-text available](#)

Mar 2020

Kristóf Kály-Kullai · ● Maria Wittmann · ● Zoltan Noszticzius · ● Laszlo Rosivall

[View](#) [Show abstract](#)**ROS in cancer therapy: the bright side of the moon**Article [Full-text available](#)

Feb 2020

Bruno Perillo · ● Marzia Di Donato · ● Antonio Pezone · ● Antimo Migliaccio

[View](#) [Show abstract](#)**Physiological and Pharmaceutical Considerations for Rectal Drug Formulations**Article [Full-text available](#)

Oct 2019

Susan Hua

[View](#) [Show abstract](#)**Vitamin D status and risk of non-Hodgkin lymphoma: An updated meta-analysis**Article [Full-text available](#)

Apr 2019 · PLOS ONE

● Hye Yin Park · ● Yun-Chul Hong · ● Kyoungho Lee · Jaewoo Koh

[View](#) [Show abstract](#)**Targeting cancer vulnerabilities with high-dose vitamin C**

Article [Full-text available](#)

Apr 2019 · NAT REV CANCER




Bryan Ngo ·  Justin Van Riper ·  Lewis C Cantley ·  Jihye Yun

[View](#) [Show abstract](#)

The role of cellular reactive oxygen species in cancer chemotherapy

Article [Full-text available](#)

Dec 2018 · J EXP CLIN CANC RES

 Haotian Yang ·  Rehan Villani ·  Haolu Wang · Xiaowen Liang

[View](#) [Show abstract](#)

Targeting peroxiredoxin 1 impairs growth of breast cancer cells and potently sensitises these cells to prooxidant agents

Article [Full-text available](#)

Oct 2018

 Malgorzata Bajor ·  Agata O. Zych ·  Agnieszka Graczyk-Jarzynka ·  Radoslaw Zagodzdon

[View](#) [Show abstract](#)

Evaluating protective and therapeutic effects of alpha-lipoic acid on cisplatin-induced ototoxicity

Article [Full-text available](#)

Aug 2018


Kyung-Hee Kim ·  Byeonghyeon Lee ·  Ye-Ri Kim ·  Kyu-Yup Lee

[View](#) [Show abstract](#)

Chlorine dioxide as a possible adjunct to metabolic treatment

Article [Full-text available](#)

Sep 2017

 Laurent Schwartz

[View](#)

Efficacy and Safety Evaluation of a Chlorine Dioxide Solution

Article [Full-text available](#)

Mar 2017 · [Int J Environ Res Publ Health](#)


Jui-Wen Ma · Bin-Syuan Huang · Chu-Wei Hsu · Shan-Shue Wang

[View](#) [Show abstract](#)

Chlorine Dioxide (CLO₂) As a Non-Toxic Antimicrobial Agent for Virus, Bacteria and Yeast (Candida Albicans)

Article [Full-text available](#)

Oct 2016



 Robert Oldham Young

[View](#) [Show abstract](#)

Potassium increases the antitumor effects of ascorbic acid in breast cancer cell lines in vitro

Article [Full-text available](#)

Apr 2016

 Giovanni Vanni Frajese ·  Monica Benvenuto ·  Massimo Fantini ·  Roberto Bei

[View](#) [Show abstract](#)**Anticancer and Antiviral Activity of Chlorine Dioxide by Its Induction of the Reactive Oxygen Species**Article [Full-text available](#)

Mar 2016

● Jin Boo Jeong · ● Yonggyun Kim · ● Sunil Kumar · ● Wook Kim

[View](#) [Show abstract](#)**Redox Modulating NRF2: A Potential Mediator of Cancer Stem Cell Resistance**Article [Full-text available](#)Nov 2015 · *OXID MED CELL LONGEV*

In-geun Ryoo · Sang-hwan Lee · Mi-Kyoung Kwak

[View](#) [Show abstract](#)**Reversing the Warburg Effect as a Treatment for Glioblastoma**Article [Full-text available](#)Feb 2013 · *J BIOL CHEM*

● Gourav Roy Choudhury · ● Ethan Poteet · ● Ali Winters · ● Shaohua Yang

[View](#) [Show abstract](#)**Neuroprotective Actions of Methylene Blue and Its Derivatives**Article [Full-text available](#)Oct 2012 · *PLoS ONE*

● Ali Winters · Liang-Jun Yan · ● Ethan Poteet · ● Shaohua Yang

[View](#) [Show abstract](#)**Inactivation of influenza virus haemagglutinin by chlorine dioxide: Oxidation of the conserved tryptophan 153 residue in the receptor-binding site**Article [Full-text available](#)Aug 2012 · *J GEN VIROL*

● Norio Ogata

[View](#) [Show abstract](#)**Vitamin D and Cancer**Article [Full-text available](#)

Apr 2012

Laura Vuolo · ● Carolina Di Somma · ● Antongiulio Faggiano · ● Annamaria Colao

[View](#) [Show abstract](#)**Oncogene-induced Nrf2 transcription promotes ROS detoxification and tumorigenesis**Article [Full-text available](#)Jul 2011 · *NATURE*

● Gina M. DeNicola · ● Florian Karreth · ● Timothy Humpton · David A. Tuveson

[View](#) [Show abstract](#)**Alternative Mitochondrial Electron Transfer as a Novel Strategy for Neuroprotection**

Article [Full-text available](#)

Mar 2011 · J BIOL CHEM

Yi Wen ·  Wenjun Li ·  Ethan Poteet ·  Shaohua Yang

[View](#) [Show abstract](#)

The natural antioxidant alpha-lipoic acid induces p27(Kip1)-dependent cell cycle arrest and apoptosis in MCF-7 human breast cancer cells

Article [Full-text available](#)

Sep 2010

 Elena Dozio ·  Massimiliano Ruscica ·  L Passafaro ·  Paolo Magni

[View](#) [Show abstract](#)

Antimicrobial efficiency of chlorine dioxide and its potential use as anti-SARS-CoV-2 agent: mechanisms of action and interactions with gut microbiota

Article

Jul 2023 · J APPL MICROBIOL




 Audry Peredo-Lovillo ·  Haydee Eliza Romero-Luna ·  Naida Juárez-Trujillo ·  Maribel Jiménez-Fernández

[View](#) [Show abstract](#)

Disinfection performance of chlorine dioxide gas at ultra-low concentrations and the decay rules under different environmental factors

Article

May 2020

Peiyong Ning ·  Dan Shan ·  Enlv Hong ·  Baiqi Wang

[View](#) [Show abstract](#)

Lipoic acid a multi-level molecular inhibitor of tumorigenesis

Article

Oct 2019



Diana Farhat ·  Lincet Hubert

[View](#) [Show abstract](#)

Advances in Rectal Drug Delivery Systems

Article

Jun 2018

 Trusha J Purohit ·  Sara Hanning ·  Zimei Wu

[View](#) [Show abstract](#)

α -Lipoic acid inhibits the migration and invasion of breast cancer cells through inhibition of TGF β signaling

Article

May 2018 · LIFE SCI

Joytirmay Tripathy ·  Anindita Tripathy ·  Muthusamy Thangaraju ·  Selvakumar Elangovan

[View](#) [Show abstract](#)

Induction of oxidative stress by anticancer drugs in the presence and absence of cells

Article

Sep 2017

Chikako Yokoyama · Yuto Sueyoshi · Mika Ema · Hisashi Hisatomi

[View](#) [Show abstract](#)**Suppression of a cancer stem-like phenotype mediated by alpha-lipoic acid in human lung cancer cells through down-regulation of β -catenin and Oct-4**[Article](#)

Jul 2017

● Preeyaporn Plaimee · ● Pithi Chanvorachote

[View](#) [Show abstract](#)**Reactive oxygen species and cancer paradox: To promote or to suppress?**[Article](#)

Jan 2017

● Sehamuddin Hussain Galadari · Anees Rahman · ● Siraj Pallichankandy · ● Faisal Thayyullathil

[View](#) [Show abstract](#)**Caloric Restriction Mimetics Enhance Anticancer Immunosurveillance**[Article](#)

Jul 2016 · CANCER CELL

● Federico Pietrocola · ● Jonathan Pol · ● Erika Vacchelli · ● Guido Kroemer

[View](#) [Show abstract](#)**Ratiometric detection and imaging of endogenous hypochlorite in live cells and: In vivo achieved by using an aggregation induced emission (AIE)-based nanoprobe**[Article](#)

May 2016

● Yong Huang · Peisheng Zhang · ● Meng Gao · ● Ben Zhong Tang

[View](#) [Show abstract](#)**Dimethyl sulfoxide (DMSO)**[Article](#)

Dec 2014

S.E. Gad · D.W. Sullivan

[View](#) [Show abstract](#)**2-Deoxy-D-glucose targeting of glucose metabolism in cancer cells as a potential therapy**[Article](#)

Sep 2014 · CANCER LETT

Dongsheng Zhang · Juan Li · Fengzhen Wang · ● Yueming Sun

[View](#) [Show abstract](#)**Effect of pH on the Inorganic Species Involved in a Chlorine Dioxide Reaction System**[Article](#)

Oct 2002

Doug R. Svenson · ● John Kadla · ● Hou-Min Chang · ● Hasan Jameel

[View](#) [Show abstract](#)

Disinfection effect of chlorine dioxide on bacteria in water[Article](#)

Mar 1997 · WATER RES

● Junli Huang · Li Wang · ● Nan-Qi Ren · Juli

[View](#) [Show abstract](#)

Denaturation of Protein by Chlorine Dioxide: Oxidative Modification of Tryptophan and Tyrosine Residues †[Article](#)

Apr 2007

● Norio Ogata

[View](#) [Show abstract](#)

Review Article: Health benefit of increased serum 25(OH)D levels from oral intake and ultraviolet-B irradiance in the Nordic countries[Article](#)

Feb 2011 · SCAND J PUBLIC HEALT

● William Burgess Grant · ● Asta Juzeniene · Johan Moan

[View](#) [Show abstract](#)

Targeting Tumor Metabolism With 2-Deoxyglucose in Patients With Castrate-Resistant Prostate Cancer and Advanced Malignancies[Article](#)

Sep 2010 · PROSTATE

● Mark Stein · ● Hongxia Lin · ● Chandrika Jeyamohan · Robert S. DiPaola

[View](#) [Show abstract](#)

Longo VD, Fontana L.. Calorie restriction and cancer prevention: metabolic and molecular mechanisms. Trends Pharmacol Sci 31: 89-98[Article](#)

Feb 2010

Valter D. Longo · Luigi Fontana

[View](#) [Show abstract](#)

[Show more](#)

Recommended publications Discover more about: [Chlorine](#)

Preprint

Chlorine dioxide solution in metastatic cancer: case series

July 2023

● Manuel Aparicio-Alonso · ● Verónica Torres-Solórzano

Chlorine dioxide is a potent oxidant with in vitro anticancer activity. Its precise mechanism of action has not been thoroughly explored, but it is proposed that it acts through the redox imbalance of cancer cells. Three patients were treated for metastatic cancer (kidney, prostate and lymphoma), on a compassionate basis. We report lasting tumor response with a combination of oral, enema and/or ...

[\[Show full abstract\]](#)

[Read more](#)

Last Updated: 20 Mar 2024



Company

[About us](#)

[News](#)

[Careers](#)

Support

[Help Center](#)

Business solutions

[Advertising](#)

[Recruiting](#)