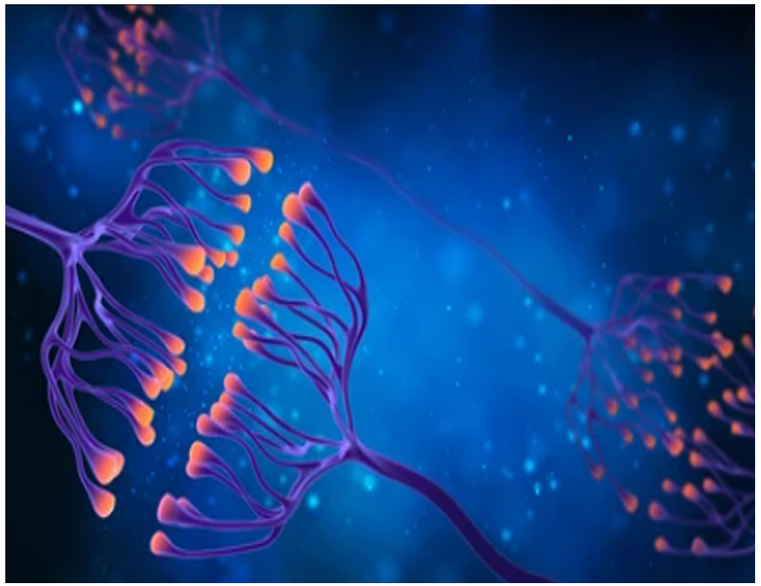
Resolving the paradox of iodine - an essential biomolecule

Blog Post 4 of 4 -
Paradox laid to rest.



Within the human body, chemical reactions occur unceasingly as we move through our world, expose ourselves to the elements and ingest various foods. For example, Vitamin D is created when skin is exposed to the sun and the vibration caused by walking initiates the molecular signaling that builds bone [31, 32].

Similarly, elemental iodine, a life essential micronutrient, is the source of diverse chemical reactions that provide a multitude of positive benefits. Taken in through food, elemental iodine generates molecular iodine which creates the hormones T3 and T4 [32]. These are used throughout the body to regulate metabolism and ensure healthy functioning of the heart, brain, and other organs [33].

Molecular iodine, created from elemental iodine, is a powerful biocide.

Whether applied topically to the skin, ingested, or integrated within prosthesis, molecular iodine kills pathogens without affecting healthy tissue. Looking specifically at the thyroid, evidence proves that molecular iodine does not damage the thyroid but provides healthful results such as reducing cancer tumors and breast pain. Molecular iodine has the ability to kill a wide array of pathogens that plague humans and animals [34].

The erroneous assumption about molecular iodine has now been properly assessed. Molecular Iodine is not a source of toxicity. This false perception comes from a major misunderstanding, because of which it has not been fully appreciated. Molecular iodine is essential for human health and capable of alleviating a multitude of negative challenges to healthy tissue caused by pathogens and cancers [35].

Molecular iodine is a naturally occurring biochemical that can function as an antioxidant [36-39], an anti-inflammatory agent [39, 40], an antiproliferative agent [41-43] and a differentiation agent [43-48].

Molecular iodine is the only widely used disinfectant molecule that plays an essential role in mammalian biochemistry [49]. If formulated properly, it can be used clinically at elevated concentrations.

Behind the Research
Dr. Jack Kessler

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Research Focus

Dr. Kessler's expertise lies in the formulation of compositions that contain molecular iodine and in systems analysis of complex medical equipment.

He has successfully formulated pure I2 for a wide range of consumer and medical applications, taken a solid oral dosage form of I2 into phase III clinical trials and demonstrated that molecular iodine is not responsible for the staining and toxicity observed with topical iodine disinfectants.

His work includes the characterization of the structure-function of bacterial neuraminidase, the chemistry of iodination reactions in the follicular lumen and development of commercial products. He has utilized a variety of techniques to incorporate molecular iodine into different compositions and to characterize these materials.

Bio

Dr. Kessler has degrees in Chemistry from the Stevens Institute of Technology, Hoboken NJ (BS, 1972) and Biochemistry from S.U.N.Y at Syracuse, NY (PhD, 1980).

He has directed numerous teams focused on the formulation and development of animal and human drugs, managed joint venture programs for commercialized products and designed/managed Phase I, II and III clinical trials for a drug to alleviate breast pain.

His patents have been the basis of development of several iodine-based products including the Violet tablet, the ioRinse line of oral care products and the enzyme-based Iodozyme teat dip previously marketed by DeLaval. Dr. Kessler has also published basic and applied research on iodine formulations and the biochemistry of iodine/thyroid hormones.

He is currently the Chief Scientific Officer at I2Pure Corp. where he oversees and guides the development and commercialization of proprietary drugs and medical devices that deliver molecular iodine technology.

References

[30] Nuckolls C. Chemical Considerations Related to The Dilution of Commercial 10% Povidone-Iodine For Use In The COVID-19 Pandemic. 2020. https://doi.org/10.31219/osf.io/8kepw.

[31] William R. Thompson,a,* Clinton T. Rubin,b and Janet Rubina, Mechanical Regulation of Signaling Pathways in Bone. Gene. 2012 Jul 25; 503(2): 179–193. Published online 2012 May 2. doi: 10.1016/j.gene.2012.04.076. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3371109/

[32] Bernard Rousset, Corinne Dupuy, Françoise Miot, Ph.D., and Jacques Dumont, M.D. Chapter 2 Thyroid Hormone Synthesis and Secretion. National Center for Biotechnology Information. https://www.ncbi.nlm.nih.gov/books/NBK285550/

[33] Carmen Aceves,Irasema Mendieta, Brenda Anguiano and Evangelina Delgado-González. Molecular Iodine Has Extrathyroidal Effects as an Antioxidant, Differentiator, and Immunomodulator. Int. J. Mol. Sci.2021, 22(3), 1228; https://doi.org/10.3390/ijms22031228

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References continued

[34] Pablo García-Solís, Yunuen Alfaro, Brenda Anguiano, Guadalupe Delgado, Raphael C.Guzman, Satyabrata Nandi, Mauricio Díaz-Muñoz, Olivia Vázquez-Martínez, Carmen Aceves. Inhibition of N-methyl-N-nitrosourea-induced mammary carcinogenesis by molecular iodine (I2) but not by iodide (I-) treatment: Evidence that I2 prevents cancer promotion. Molecular and Cellular Endocrinology Volume 236, Issues 1–2, 31 May 2005, Pages 49-57. https://doi.org/10.1016/j.mce.2005.03.001 https://www.sciencedirect.com/science/article/abs/pii/S0303720705001206?via%3Dihub

[35] Aura Moreno-Vega, Laura Vega-Riveroll, Tonatiuh Ayala, Guillermo Peralta, José Miguel Torres-Martel, Joel Rojas, Perla Mondragón, Adriana Domínguez, Rodrigo De Obaldía, Carlos Avecilla-Guerrero, Brenda Anguiano, Evangelina Delgado-González, Xóchitl Zambrano-Estrada, Olga Cuenca-Micó, Olivia De La Puente Flores, Alfredo Varela-Echavarría and Carmen Aceves. Adjuvant Effect of Molecular Iodine in Conventional Chemotherapy for Breast Cancer. Randomized Pilot Study. Nutrients 2019, 11(7), 1623; https://www.mdpi.com/2072-6643/11/7/1623.

[36] Venturi S, Donati FM, Venturi A, Venturi M, Grossi L, Guidi A. Role of iodine in evolution and carcinogenesis of thyroid, breast and stomach. Adv Clin Path 2000;4(1):11-7, https://www.ncbi.nlm.nih.gov/pubmed/10936894.

[37] Kupper FC, Carpenter LJ, McFiggans GB, Palmer CJ, Waite TJ, Boneberg EM, et al. Iodide accumulation provides kelp with an inorganic antioxidant impacting atmospheric chemistry. Proceedings of the National Academy of Sciences of the United States of America 2008;105(19):6954-8. https://doi.org/10.1073/pnas.0709959105.

[38] Berking S, Czech N, Gerharz M, Herrmann K, Hoffmann U, Raifer H, et al. A newly discovered oxidant defence system and its involvement in the development of Aurelia aurita (Scyphozoa, Cnidaria): reactive oxygen species and elemental iodine control medusa formation. Int J Dev Biol 2005;49(8):969-76. https://doi.org/10.1387/ijdb.052024sb.

[39] Moore K TA, Harding KG. 1997 Jan;29(1):163-71. Iodine released from the wound dressing Iodosorb modulates the secretion of cytokines by human macrophages responding to bacterial lipopolysaccharide. Int J Biochem Cell Biol 1997;29(1):8. https://doi.org/10.1016/s1357-2725(96)00128-8.

[40] Beukelman CJ, van den Berg AJ, Hoekstra MJ, Uhl R, Reimer K, Mueller S. Anti-inflammatory properties of a liposomal hydrogel with povidone-iodine (Repithel) for wound healing in vitro. Burns 2008;34(6):845-55. https://doi.org/10.1016/j.burns.2007.11.014.

[41] Dugrillon A, Gartner R. delta-Iodolactones decrease epidermal growth factor-induced proliferation and inositol-1,4,5-trisphosphate generation in porcine thyroid follicles--a possible mechanism of growth inhibition by iodide. European journal of endocrinology / European Federation of Endocrine Societies 1995;132(6):735-43. https://doi.org/10.1530/eje.0.1320735.

[42] Gartner R, Rank P, Ander B. The role of iodine and delta-iodolactone in growth and apoptosis of malignant thyroid epithelial cells and breast cancer cells. Hormones (Athens, Greece) 2010;9(1):60-6. https://doi.org/10.14310/horm.2002.1254

[43] Rösner H, Möller W, Groebner S, Torremante P. Antiproliferative/cytotoxic effects of molecular iodine povidone-iodine and Lugol's solution in different human carcinoma cell lines. Oncol Lett 2016;12(3):2159-62. https://doi.org/10.3892/ol.2016.4811.

[44] Shrivastava A, Tiwari M, Sinha RA, Kumar A, Balapure AK, Bajpai VK, et al. Molecular iodine induces caspase-independent apoptosis in human breast carcinoma cells involving the mitochondria-mediated pathway. Date of Input: 5/6/2003 2006;281(28):19762-71. https://doi.org/10.1074/jbc.M600746200.

[45] Aceves C, Garcia-Solis P, Arroyo-Helguera O, Vega-Riveroll L, Delgado G, Anguiano B. Antineoplastic effect of iodine in mammary cancer: participation of 6-iodolactone (6-IL) and peroxisome proliferator-activated receptors (PPAR). Molecular cancer 2009;8:33. https://doi.org/10.1186/1476-4598-8-33.

[46] Moreno-Vega A, Vega-Riveroll L, Ayala T, Peralta G, Torres-Martel JM, Rojas J, et al. Adjuvant Effect of Molecular Iodine in Conventional Chemotherapy for Breast Cancer. Randomized Pilot Study. Nutrients 2019;11(7). https://doi.org/10.3390/nu11071623.

[47] Anguiano B, Garcia-Solis P, Delgado G, Aceves Velasco C. Uptake and gene expression with antitumoral doses of iodine in thyroid and mammary gland: evidence that chronic administration has no harmful effects. Date of Input: 3/10/2009 2007;17(9):851-9. https://doi.org/10.1089/thy.2007.0122. https://doi.org/10.1089/thy.2007.0310 .

References continued

[48] Mendieta I, Nunez-Anita RE, Nava-Villalba M, Zambrano-Estrada X, Delgado-Gonzalez E, Anguiano B, et al. Molecular iodine exerts antineoplastic effects by diminishing proliferation and invasive potential and activating the immune response in mammary cancer xenografts. BMC Cancer 2019;19(1):261. https://doi.org/10.1186/s12885-019-5437-3.

[49] Kessler J, Obinger C, Eales G. Factors influencing the study of peroxidase-generated iodine species and implications for thyroglobulin synthesis. Date of Input: 3/10/2009 2008;18(7):769-74. https://doi.org/10.1089/thy.2007.0310 .

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