Prof. Jacob Vaya

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Teaching

Graduate course:

- Antibiotic compounds –types, mode of action, resistance, 2004-2019.

Undergraduate courses:

- Antioxidants, chemistry, production, and uses in the food and cosmetic industry,1992-1997
- Organic Chemistry Course, 1996-present.
- Fundamentals of Chemistry, 2019-present.
- Biochemistry Course, 2004-2018.
- Oxido/redox homeostasis in biology: Radicals, ROS/RNS, properties, Damages, antioxidants (enzymatic, non-enzymatic), markers of oxidative stress, 2003-2012

Supervisor of 20 Graduate Students (MSc, PhD)

Academic appointments

- Visiting prof' GTIIT – Guandong Technion Israel Institute of Technology, China, 2019-present
- Dean, Faculty of Science and Technology, Tel-Hai Academic College, 2014- 2019
- Dean, Research Authority, Tel-Hai Academic College, 2017-2019
- Head of the Laboratory of Oxidative Stress and Human Diseases, Migal Galilee Research Institute, 1992- 2020
- Member of the Council for Higher Education of Israel, 2012-2014
- President of the Israeli Society for Oxygen and Free Radicals Research-ISOFRR, 2012-2014

Education

- Ph.D. Chemistry, Weizmann Institute, Rehovot, Israel, Ph.D. Supervision by Prof. Mario D. Bachi. Thesis title: Investigations on β-Lactams Structurally Related to Penicillins and Cephalosporins, 1974-1978
- M.Sc. Chemistry, Hebrew University Jerusalem, Israel, 1971-1973
- B.Sc. Chemistry, Hebrew University Jerusalem, Israel, 1968-1971

Current Research Topics - Oxidative Stress and Diseases

- Multifunctional synthetic markers for early detection of oxidative stress susceptibility and application to Human diseases.
- Isolation and structure elucidation of natural/ /and synthetic compounds that improve HDL function (quality). Structure-activity relationship studies (SAR).
- Identification of VOCs specific to a disease. Detection of volatile organic compounds in blood for characterization of human diseases profile.
- The impact of interactions between specific natural small molecules with proteins on protein function.
- Method for obtaining modified proteins (antibodies) and viruses with intact native binding sites with an immune silencing response.

Publication in International Refereed Journals:

112 articles published in refereed international journals. Total citations-8770.

Below list of representative's articles:

1**.** Bachi M.D.*,* **Vaya J.** 1976. Azetidin-2-oxo-4-thiones: Novel thermolytic product of β-lactam sulfoxides. *J. Am. Chem. Soc*. 98: 7825-7826

2. Kelly T.R., **Vaya J.,** Ananthasubramanian L. 1980. An efficient, regiospecific synthesis of (±)-daunomycinone. *J. Am. Chem. Soc*. **102:** 5983-5984.

3. Keinan E., Kumar S., Dangur V., **Vaya J**. 1994. Evidence for a cyclic mechanism in (η^3-allyl) palladium chemistry. Promotion of β-hydride elimination by unsaturated organometallics. *J. Am. Chem. Soc*. **116**: 11151.

4. **Vaya J**., Belinky P., Aviram M. 1997. Antioxidant constituents from licorice roots: isolation, structure elucidation and antioxidative capacity toward LDL oxidation. *Free Radic. Biol. Med*. 23: 302-313.

5. **Vaya, J.,** and Snait Tamir. The relation between the chemical structure of flavonoids and their estrogen-like activities **(2004)**. *Current Medicinal Chemistry***.** 11:1333-1343.

6. Soliman Khatib, Ohad Nerya, Ramadan Musa, Snait Tamir, **Vaya, J**., Chalcones as potent tyrosinase inhibitors. The importance of a 2,4-substituted resorcinol moiety. **(2005)**. *Biorganic & Medicinal Chemistry*. 13(2), 433-441.

7. **Vaya, J.,** Wei Song**,** Soliman Khatib, Guoyan Geng, and Hyman M. Schipper. Effects of Heme Oxygenase-1 Expression on Sterol Homeostasis in Rat Astroglia. **(2007).** *Free Radicals Biology & Medicine*. 42, 864-871.

8. Soliman Khatib, Ramadan Musa**, Vaya, J.,** An exogenous marker: A novel approach for the characterization of oxidative stress. **(2007).** *Bioorganic Medicinal Chemistry*. 15 (11), 3661-66.

9. **Vaya, J.,** and Hyman M. Schipper. Oxysterols, Cholesterol Homeostasis and Alzheimer Disease. **(2007).** *Journal of Neurochemistry*. 102, 1727-1737.

10. **Jacob Vaya** , Elina Aizenshtein, Soliman Khatib, Tal Gefen, Michael Fassler, Ramadan Musa, Simi Krispel, Jacob Pitcovski. Mannosamine-Biotin as a Novel Masking Agent for Coating IgG for Immune Response Silencing and Augmentation of Antibody-Antigen Interaction. **(2009).** *Vaccine*. 27(49):6869-76.

11. Tavori H, Aviram M, Khatib S, Musa R, Mannheim D, Karmeli R, **Vaya J.** Human carotid lesion linoleic acid hydroperoxide inhibits paraoxonase 1 (PON1) activity via reaction with PON1 free sulfhydryl cysteine 284. **(2011)**. *Free Radic. Biol. Med*. 50, 148-156.

12**. Jacob Vaya**. Exogenous markers for the characterization of human diseases associated with oxidative stress**. (2013).** *Biochimie*. 95, p. 578-584

13**.** Dana Atrahimovich, **Jacob Vaya**, Soliman Khatib. The effects and mechanism of flavonoids-rePON1 interactions. Structure-activity relationship study. **(2013)**. *Bioorganic & Medicinal Chemistry*. 21(11):3348-55.

14**.** Khatib S, Artoul F, Gershko M, Markman G, **Vaya J**. The synthesis and analysis of S-nitorsylated paraoxonase 1. **(2014).** *Biochem Biophys Res Commun*. 444, 354-359.

15. Elad Cohen., Michael Aviram., Soliman Khatib., Mira Rosenblat., **Jacob Vaya**. **(2015).** Human carotid atherosclerotic lesion protein components decrease cholesterol biosynthesis rate in macrophages through 3-hydroxy-3-methylglutaryl-CoA reductase regulation. *BioFactors*, 41 (1), 28-34.

16. Presence of dipalmitoylphosphatidylcholine from the lungs at the active hydrophobic spots in the vasculature where bubbles are formed on decompression. R Arieli, S Khatib, **J Vaya**. *Journal of Applied Physiology* 121 (3), 811-815, **(2016).**

17. Human carotid atherosclerotic plaque protein (s) change HDL protein (s) composition and impair HDL anti-oxidant activity. E Cohen, M Aviram, S Khatib, N Volkova, **J Vaya** *BioFactors* 42 (1), 115-128, **(2016).**

18. Atrahimovich D., Samson A. O., Khattib A., **Vaya, J**. and Khatib S. Punicalagin decreases serum glucose levels and increases PON1 activity and HDL anti-inflammatory values in Balb/c mice fed a high-fat diet. *Oxidative Medicine and Cellular Longevity*, **(2018).**

19. Dahli L., Atrahimovich D., **Vaya J**. and Khatib S. Lyso-DGTS lipid isolated from microalgae enhances PON1 activities in vitro and in vivo, increases PON1 penetration into macrophages and decreases cellular lipid accumulation. *BioFactors* 44(3), 299-310. **(2018).**

20. Genome-wide localization of the polyphenol quercetin in human monocytes. D. Atrahimovich, AO Samson, Y Barsheshet, **J. Vaya**, S Khatib, E Reuveni. *BMC genomics* 20 (1), 606. **(2019).**

21. *Nannochloropsis* sp. ethanol extract prevents macrophage and LDL oxidation and enhances PON1 activity through the principal active compound lyso. S Khatib, F Artoul, I Paluy, L Boluchevsky, E Kvitnitsky, **J. Vaya.** *Journal of Applied Phycology* 30 (3), 1679-1689

22. Ovine plasma dipalmitoylphosphatidylcholine does not predict decompression bubbling. R Arieli, S Khatib, **J. Vaya**. Respiratory Physiology & Neurobiology 259, 26-29, **(2019).**

23. Lyso-diacylglyceryltrimethylhomoserine (lyso-DGTS) isolated from Nannochloropsis microalgae improves high-density lipoprotein (HDL) functions. A Khattib, D Atrahimovich, L Dahli, **J. Vaya**, S Khatib. BioFactors 46 (1), 146-157. **(2020).**

Striatal Isolated from Cyathus striatus Extracts Induces Apoptosis in Human Pancreatic Cancer Cells. Fares, F., Khatib, S., **Vaya, J**., (...), Eizenberg, E., Wasser, S. Molecules 27(9), 2746. **(2022).**