



[Kostas Iatrou, Research Director](#)

Insect    Molecular Genetics and Biotechnology Group

Institute    of Biosciences & Applications

NCSR    “Demokritos”

e-mail:                      [iatrou@bio.demokritos.gr](mailto:iatrou@bio.demokritos.gr)

tel:    +30-210650-3562 fax: +30-210651-1767

## General

Dr. Kostas Iatrou, formerly Professor of Biochemistry and Molecular Biology at the Faculty of Medicine, University of Calgary, Canada (1981-2001; Adjunct Professor 2001-today) and Director of the Institute of Biology at the National Centre for Scientific Research “Demokritos” in Athens, Greece (1988-2003), is the Head of the Institute’s “Insect Molecular Genetics and Biotechnology” Group. His expertise is in insect developmental genetics, molecular biology and biotechnology. His interests are focused on the regulation of specific physiological processes in insects of relevance to medicine and agriculture and the design of novel methods for efficient and environmentally safe control of their populations. Besides their basic research activities, the teams he directed in Calgary and Athens have developed important biotechnological tools and

applications derived from insect systems. These include proprietary lepidopteran insect cell-based expression systems and engineered baculovirus-based platforms that have found multiple uses in the biomedical and agricultural fields. The latter include cell-based high throughput screening platform development for identification of leads with potential drug and insecticide applications, the use of engineered baculoviruses for continuous protein production in insect systems and the development of baculovirus-based mammalian cell transduction vectors for gene and cell therapy applications. For his work, Dr. latrou has received a number of fellowships and awards from organizations such as the International Agency for Cancer Research, the European Molecular Biology Organization, the Jane Coffin Childs Memorial Fund for Medical Research, the Leukemia Society of America, the Medical Research Council of Canada, the Alberta Heritage Foundation of Medical Research, the Japanese Society for the Advancement of Science and the Fulbright Foundation.

## Areas of research activities

**1. Regulatory mechanisms controlling insect physiological functions:** (i) Oogenesis in lepidopteran insects: a model for differentiation programs induced by ecdysteroid hormones; (ii) Mechanisms of immunosuppression in lepidopteran insects following parasitization by hymenopteran endoparasitoids: the role of the interactions between proteins produced by hymenopteran endosymbiotic polydnaviruses and hemocyte proteins of the lepidopteran hosts; (iii) Mechanisms controlling olfactory function in the malaria mosquito vector *Anopheles gambiae*

**2. Molecular Biology and genetic manipulation of insect nuclear polyhedrosis viruses:** (i) Viruses expressing proteins harmful to the insect hosts; (ii) Inactivated viruses as vectors for insect genetic transformation; (iii) Modified viruses as vectors for human gene therapy, cellular immunization and induced pluripotent stem cell generation.

**3. Functional genomics:** (i) Systems for production of proteins of economic importance in lepidopteran insect and mammalian cell lines; (ii) Cell-based high throughput screening platforms for identification of bioactive substances (activators and inhibitors of pharmacological targets) in synthetic compound libraries and collections of natural products (plants and microorganisms).

## Recent Publications (2008 - 2012)

latrou, K. and Biessmann, H. (2008). Sex-biased expression of odorant receptors in antennae and palps of the African malaria vector *Anopheles gambiae*. *Insect Biochem. Mol. Biol.* 38, 268-274.

Soin, T., Swevers, L., Mosallanejad, H., Efrose, R., Labropoulou, V., Iatrou, K., Smagghe, G. (2008). Juvenile hormone analogs do not affect directly the activity of the ecdysteroid receptor complex in insect culture cell lines. *J. Insect Phys.* 54, 429-438.

Labropoulou V., Douris, V., Stefanou, D., Magrioti, C., Swevers, L. and Iatrou, K. (2008). Endoparasitoid wasp bracovirus-mediated inhibition of hemolin function and lepidopteran host immunosuppression. *Cell. Microbiol.* 10, 2118–2128.

Swevers, L., Soin, T., Mosallanejad, H., Iatrou, K. and Smagghe, G. (2008). Ecdysteroid signaling in ecdysteroid-resistant cell lines from the polyphagous noctuid pest *Spodoptera exigua*. *Insect Biochem Mol Biol.* 38, 825–833.

Mosallanejad, H., Soin, T., Swevers, L., Iatrou, K., Nakagawa, Y. and Smagghe, G. (2008). Non-steroidal ecdysteroid agonist chromafenozide: gene induction activity, cell proliferation inhibition and larvicidal activity. *Pesticide Biochem. Physiol.* 92, 70-76.

Swevers, L. and Iatrou, K. (2009). Ecdysteroids and Ecdysteroid Signaling Pathways During Insect Oogenesis. In: “*Ecdysone: structures and functions*” (G. Smagghe, ed.), Part II: In the Post-genomic Era, Ecdysteroid Genetic Hierarchies in Insect Growth and Reproduction. Springer Science, pp. 127-164.

Hannan, GN, Hill, RJ, Dedos, SG, Swevers, L, Iatrou, K, Tan, A, Parthasarathy, R, Bai, H, Zhang, Z, and Subba R. Palli, SR (2009) Applications of RNA Interference in Ecdysone Research. In: “*Ecdysone: structures and functions*” (G. Smagghe, ed.), Part II: In the Post-genomic Era, Ecdysteroid Genetic Hierarchies in Insect Growth and Reproduction. Springer Science, pp. 205-227.

Georgomanolis, T., Iatrou, K. and Swevers, L. (2009). BmCAP, a silkworm gene encoding multiple protein isoforms characterized by SoHo and SH3 domains: expression analysis during

ovarian follicular development. *Insect Biochem. Mol. Biol.* 39, 892-902.

Soin, T., De Geyter, H., Mosallanejad H., Iga, M., Martín, D., Ozaki, S., Shigeki Kitsuda, S., Harada, T., Miyagawa, H., Stefanou, D., Kotzia, G., Efrose, R., Labropoulou, V., Geelen, D., Iatrou, K., Nakagawa, Y., Janssen, C.R., Smagghe, G., and Swevers, L. (2010). Assessment of species specificity of molting accelerating compounds in Lepidoptera: comparison of activity between *Bombyx mori* and *Spodoptera littoralis* by *in vitro* reporter and *in vivo* toxicity assays. *Pest Manag Sci*

66

, 526–535.

Biessmann, H., Andronopoulou, E., Biessmann, M.R., Douris, V., Dimitratos, S.D., Eliopoulos, E., Guerin, P.M., Iatrou, K., Justice, R.W., Kröber, T., Marinotti, O., Tsitoura, P., Woods, D.F., and Walter, M.F. (2010). The *Anopheles gambiae* Odorant Binding Protein 1 (AgamOBP1) mediates indole recognition in the antennae of female mosquitoes.

*PLoS ONE*

5

, e9471.

Soin T, Swevers L, Kotzia G, Iatrou K, Janssen CR, Rougé P, Harada T, Nakagawa Y, Smagghe G. (2010). Comparison of the activity of non-steroidal ecdysone agonists between dipteran and lepidopteran insects, using cell-based EcR reporter assays. *Pest Manag Sci.* 66, 1215-29.

Efrose, R., Swevers, L. and Iatrou, K. (2010). Baculoviruses deficient in *ie1* gene function abrogate viral gene expression in transduced mammalian cells.

*Virology*

406

, 293-301.

Lavdas, A., Efrose, R., Douris, V., Gaitanou, M., Swevers, L., Thomaidou, D., Iatrou, K., Matsas, R. (2010). Soluble forms of the cell adhesion molecule L1 produced by insect and baculovirus-transduced mammalian cells enhance Schwann cell motility. *J. Neurochem.* 115, 1137-1149.

Tsitoura, P., Andronopoulou, E., Tsikou, D., Agalou, A., Kotzia, G.A., Labropoulou, V., Swevers, L., Georgoussi, Z., Iatrou, K. (2010). Expression and membrane topology of *Anopheles gambiae* odorant receptors in lepidopteran insect cells. *PLoS One* 5(11):e15428.

Qiao, H., He, X., Schymura, D., Ban, L., Field, L., Romana Dani, F., Elena Michelucci, E., Caputo, B., Della Torre, A., Iatrou, K., Jing-Jiang Zhou, J., Krieger, J., and Pelosi, P. (2010). Binding assays reveal cooperative interactions between odorant-binding proteins of *Anopheles gambiae*. *Cell. Mol. Life Sci.* 68(10):1799-813.

Schymura, D., Forstner, M., Schultze, A., Kröber, T., Swevers, L., Iatrou, K. and Krieger, J. (2010). Antennal expression pattern of two olfactory receptors and an odorant binding protein implicated in host-odor detection by the Malaria vector *Anopheles gambiae*. *Int. J. Biol. Sci.* 6, 614-626.

Terenius, O., Papanicolaou, A., Garbutt, J.S., Eleftherianos I., Huvenne, H., Sriramana, K., Albrechtsen, M., An, C., Aymeric, J.-L., Barthel, A., Bebas, P., Bitra, K., Bravo, A., Chevalier, F., Collinge, D.P., M. Crava, C.M., de Maagd, R.A., Duvic, B., Erladson, M., Faye, I., Felföldi, G., Fujiwara, H., Futahashi R., Gandhe, A.S., Gatehouse, H.S., Laurence N. Gatehouse, L.N., Giebultowicz, J., Gómez I., Grimmelikhuijzen C.J., Groot A.T., Hauser, F., Heckel, D.G., Hegedus, D.D., Hrycaj, S., Huang, L., Hull, J.J., Iatrou, K., Iga, M., Kanost, M.R., Kotwica, J., Li, C., Li, J., Liu, J., Lundmark, M., Matsumoto, S., Meyering-Vos, M., Millichap, P.J., Monteiro, A., Mrinal, N., Niimi, T., Nowara, D., Ohnishi, A., Oostra, V., Ozaki, K., Papakonstantinou, M., Popadic, A., Rajam, M.V., Suzanne Saenko, S., Simpson R.M., Soberón M., Strand M.R., Tomita S., Toprak, U., Wang, P., Wee, C.W., Whyard, S., Zhang, W., Nagaraju, J., French-Constant, R.H., Herrero, S., Gordon, K., Swevers, L., Smagghe, G. (2010). RNA interference in Lepidoptera: an overview of successful and unsuccessful studies and implications for experimental design. *J. Insect Physiol.* 57, 231-245.

Tsitsanou, KE, , Thireou, T., Drakou, CE, Koussis, K, Keramioti, MV, Leonidas, DD, Eliopoulos, E, Iatrou, K, Zographos, SE (2011) *Anopheles gambiae* odorant binding protein crystal complex with the synthetic repellent DEET: implications for structure-based design of novel mosquito repellents. *Cell Mol Life Sci* DOI 10.1007/s00018-011-0745- z.

Magkrioti, C, Iatrou, K and Labropoulou, V (2011) Differential inhibition of BmRelish1-dependent transcription in lepidopteran cells by bracovirus ankyrin-repeat proteins. *Insect Biochem Mol*

*Biol* , 41, 993-1002.

Sdralia, N., Swevers, L. and Iatrou, K. (2012). BmVMP90, a large vitelline membrane protein of the domesticated silkworm *Bombyx mori*, is an essential component of the developing ovarian follicle. *Insect Biochem Mol Biol*, In Press.

Liu, J., Swevers, L., Iatrou, K., Huvenne, H., Smagghe, G. (2012). *Bombyx mori* DNA/RNA non-specific nuclease: Expression of isoforms in insect culture cells, subcellular localization and functional assays.  
*J. Insect Physiol.*  
58, 1166-1176.

## Links

<http://bio.demokritos.gr/iatrou>

<http://www.enaromatic.org>