

氏名	平野 将司
職名	グローバル COE 研究員
所属部局（専攻等）	沿岸環境科学研究センター 化学汚染・毒性解析部門
E-mail	m-hirano'at'agr.ehime-u-ac.jp
これまでの研究の成果、アピールすべき点	
<p>現存する大部分の主要な無脊椎動物の分類群は、脊椎動物とは異なる系統から進化しています。従って、無脊椎動物群の内分泌系は、脊椎動物とは共通点が少なく、化学物質に対する特有な感受性を有していると考えられます。しかしながら、化学物質による水圏生物への毒性影響に関する研究の多くは、主に水域生態系の高次に位置する脊椎動物を対象としたものであり、より低次に位置する無脊椎動物については知見が少ないのが現状です。</p> <p>これまで、世界の沿岸域に広く分布し、被捕食生物また水産食糧資源として海洋生態系における非常に重要な位置を占めている海産甲殻類アミ（<i>Mysid crustacean</i>）をモデル生物として、水圏無脊椎動物に対する化学物質の影響評価手法の確立を行ってきました。また、不明な点が多い甲殻類の内分泌調節機構について基礎的知見の集積を行うと共に、これら生体分子に対する化学物質の影響評価について研究を遂行してきました。これまでの成果として、アミは化学物質に対する毒性学的感受性が高いことを明らかにし、また化学物質により脱皮を制御するエクジステロイドの分泌量減少やその標的遺伝子の発現変化が起こり、脱皮周期の遅延が惹起されることを明らかにしました。</p> <p>現在、水圏無脊椎動物に対する化学物質の潜在的な影響を評価するため、外因性の化学物質によってその生物学的恒常性の機能異常が容易に誘起されると考えられる <i>ecdysone receptor</i> (EcR) を介した生体反応に着目し、EcR を起点とした情報伝達機構に対する化学物質の影響について解析を進めています。</p>	
<p>研究業績：主な発表論文名（論文名,著者名,学会誌名,巻,号,最初と最後の頁,発表年(西暦)の各項目を必ず記載すること。<u>本人に下線を引くこと</u>）</p>	

- 1) **Hirano, M.**, Ishibashi, H., Kim, J.W., Matsumura, N. and Arizono, K. (2009) Effects of environmentally relevant concentrations of nonylphenol on growth and 20-hydroxyecdysone levels in mysid crustacea, *Americamysis bahia*. *Comp. Biochem. Physiol. C Toxicol. Pharmacol.*, **149**(3), 368-373.
- 2) Kim, J.W., Ishibashi, H., Yamauchi, R., Ichikawa, N. Takao, Y., **Hirano, M.**, Koga, M. and Arizono, K. (2009) Acute toxicity of pharmaceutical and personal care products on freshwater crustacean (*Thamnocephalus platyurus*) and fish (*Oryzias latipes*). *J. Toxicol. Sci.*, **34**(2), 227-232.
- 3) Kim, J.W., Jang, H.S., Kim, J.G., Ishibashi, H., **Hirano, M.**, Nasu, K., Ichikawa, N., Takao, Y., Shinohara, R. and Arizono, K. (2009) Occurrence of pharmaceutical and personal care products (PPCPs) in surface water from Mankyung River, South Korea. *J. Health Sci.*, **55**(2), 249-258.
- 4) Yokota, K., Kato, C., **Hirano, M.**, Ishibashi, H., Shiratsuchi, H., Tachibana, K. and Arizono, K. (2008) Toxicity to early life stages on medaka (*Oryzias latipes*) and *in vitro* estrogen intensity of bisphenol compounds. *Jpn. J. Environ. Toxicol.*, **11**(2), 133-142.
- 5) Yamauchi, R., Ishibashi, H., **Hirano, M.**, Mori, T., Kim, J.W. and Arizono, K. (2008) Effects of synthetic polycyclic musks on estrogenreceptor, vitellogenin, pregnane X receptor, and cytochrome P450 gene expression in the livers of male medaka (*Oryzias latipes*). *Aquat. Toxicol.*, **90**(4), 261-268.
- 6) Ishibashi, H., Yamauchi, R., Matsuoka, M., Kim, J.W., **Hirano, M.**, Yamaguchi, A., Tominaga, N. and Arizono, K. (2008) Fluorotelomer alcohols induce hepatic vitellogenin through activation of the estrogen receptor in male medaka (*Oryzias latipes*). *Chemosphere*, **71**(10), 1853-1859.
- 7) **Hirano, M.**, Kitamura, K., Kato, I., Yanaiharu, C., Iwamoto, K., Sekiyama, M., Watanabe, C., Nakamoto, T., Miyamoto, N., Onishi, Y. and Arizono, K. (2008) Development of enzyme immunoassay for detection of DDT. *J. Environ. Sci. Health B*, **43**(1), 44-49.
- 8) Ishibashi, H., **Hirano, M.**, Matsumura, N., Watanabe, N., Takao, Y. and Arizono, K. (2006) Reproductive effects and bioconcentration of 4-nonylphenol in medaka fish (*Oryzias latipes*). *Chemosphere*. **65**(6), 1019-1026.
- 9) Matsumura, N., Ishibashi, H., **Hirano, M.**, Nagao, Y., Watanabe, N., Shiratsuchi, H., Kai, T., Nishimura, T., Kashiwagi, A. and Arizono, K. (2005) Effects of nonylphenol and triclosan on production of plasma vitellogenin and testosterone in male South African clawed frogs (*Xenopus laevis*). *Biol. Pharm. Bull.*, **28**, 1748-1751.
- 10) **Hirano, M.**, Matsuoka, M., Matsumura, N., Nakamoto, T., Kohra, S., Yoshihara, S., Tominaga, N., Ishibashi, H. and Arizono, K. (2005) Acute and subchronic toxicity of a bisphenol A metabolite, 4-methyl-2,4-bis(4-hydroxyphenyl)pent-1-ene on the invertebrates. *Jpn. J. Environ. Toxicol.*, **8**, 65-76.
- 11) Ishibashi, H., Watanabe, N., Matsumura, N., **Hirano, M.**, Nagao, Y., Kohra, S., Yoshihara, S. and Arizono, K. (2005) Toxicity to early life stages and an estrogenic effect of a bisphenol A metabolite, 4-methyl-2,4-bis(4-hydroxyphenyl)pent-1-ene on the medaka (*Oryzias latipes*). *Life Sciences*, **77**, 2643-2655.

- 12) Ishibashi, H., Matsumura, N., Hirano, M., Matsuoka, M., Shiratsuchi, H., Ishibashi, Y., Takao, Yu. and Arizono, K. (2004) Effects of triclosan on the early life stages and reproduction of medaka (*Oryzias latipes*) and induction of hepatic vitellogenin, *Aquat. Toxicol.*, **67**(2), 167-179.
- 13) Hirano, M., Ishibashi, H., Watanabe, N., Matsumura, N., Shiratsuchi, H., Watanabe, A., Onikura, N., Kishi, K. and Arizono, K. (2004) Effects of 17 $\beta$ -estradiol on survival, growth, sexual development and molting cycles of marine crustacean mysid shrimp, *Americamysis bahia*, *Environ. Sci.*, **11**, 259-268.
- 14) Hirano, M., Ishibashi, H., Matsumura, N., Nagao, Y., Watanabe, N., Watanabe, A., Onikura, N., Kishi, K. and Arizono, K. (2004) Acute toxicity responses of two crustaceans, *Americamysis bahia* and *Daphnia magna*, to endocrine disrupters, *J. Health Sci.*, **50**(1), 97-100.  
(査読無し)
- 15) M. Hirano, H. Ishibashi, R. Yamauchi, J.W. Kim and K. Arizono. (2008) Expression analysis of ecdysone receptor and ultraspiracle through molting period in mysid crustacean, *Americamysis bahia*. Proceeding for International Symposium on Biological Responses to Chemical Pollutants: Toward Establishing an Asian Network of Environmental Toxicology.

学会発表・受賞・その他 (本人に下線を引くこと)

(国際学会・シンポジウム・会議のみ)

- 1) Masashi Hirano, Hiroshi Ishibashi, Ryoko Yamauchi, Joon-Woo Kim, and Koji Arizono, Expression analysis of ecdysone receptor and ultraspiracle mRNA through molting period in mysid, *Americamysis bahia*, Society of Environmental Toxicology and Chemistry (SETAC) 18th Annual Meeting in Europe, Warsaw, Poland, May 2008.
- 2) Masashi Hirano, Hiroshi Ishibashi, Ryoko Yamauchi, Joon-Woo Kim, and Koji Arizono, Characterization of ecdysone receptor and ultraspiracle mRNA through molting period in mysid, *Americamysis bahia*, International Symposium on Biological Responses to Chemical Pollutants: Toward Establishing an Asian Network of Environmental Toxicology. Organized by Global COE program in Ehime University. March 2008.
- 3) M. Hirano, H. Ishibashi, N. Watanabe, Y. Takao, T. Nishimura, and K. Arizono, Combination effects of estradiol-17 $\beta$ , 4-*t*-octylphenol and bisphenol A on the reproduction and estrogen-responsive gene expression of medaka (*Oryzias latipes*), Society of Environmental Toxicology and Chemistry (SETAC) 17th Annual Meeting in Europe, Porto, Portugal, May 2007
- 4) Masashi Hirano, Kazuyuki Kitamura, Ikuo Kato, Chizuko Yanaihara, Ken-ichi Iwamoto, Takashi Nakamoto, Nobukazu Miyamoto, Yuta Onishi and Koji Arizono, Development of an Enzyme Immunoassay for Quantification of DDT, 8<sup>th</sup> AANESWM (Asian Academic Network for Environmental Safety and Waste Management), Chennai, India, 2006.12.20.
- 5) M. Hirano, H. Ishibashi, N. Watanabe, N. Tatarazako, and K. Arizono, Biological effects of fenoxycarb on estuarine mysid shrimp (*Americamysis bahia*), Society of Environmental Toxicology and Chemistry (SETAC) 27th Annual Meeting in North America, Montreal, Canada, November, 2006
- 6) M. Hirano, K. Iwamoto, I. Kato, K. Kitamura, C. Yanaihara, T. Nakamoto, N. Miyamoto, Y. Onishi, Y.

- Hirabaru, and K. Arizono, Development of enzyme-linked immunosorbent assay for detection of DDT, Society of Environmental Toxicology and Chemistry (SETAC) Asia/Pacific, Peking, China, September (2006)
- 7) Masashi Hirano, Hiroshi Ishibashi, Naoko Watanabe, Yuko Iwasaki, Hirokazu Miyazaki and Koji Arizono: Effects of nonylphenol on the molting cycles of estuarine mysid shrimp (*Americamysis bahia*), Society of Environmental Toxicology and Chemistry (SETAC) 26th Annual Meeting in North America, Baltimore, Maryland, USA, November (2005)
- 8) Naoko Watanabe, Hiroshi Ishibashi, Masashi Hirano, Yuko Iwasaki, Naomi Matsumura, Hideki Shiratsuchi, Yuji Takao, Tetsuji Nishimura, Koji Arizono: Combination effects of environmental estrogenic compounds on the reproduction of medaka *Oryzias latipes*, Fourth Society of Environmental Toxicology and Chemistry (SETAC) World Congress and 25th Annual Meeting, Portland, Oregon, USA, November(2004)
- 9) Hiroshi Ishibashi, Naoko Watanabe, Naomi Matsumura, Yukiko Nagao, Masashi Hirano, Shinya Kohra, Shin-ichi Yoshihara, Koji Arizono: Toxicological effects of bisphenol A metabolite, 4-methyl-2,4-bis(*p*-hydroxyphenyl)-pent-1-en (MBP), on the early life stages of medaka *Oryzias latipes* and induction of hepatic vitellogenin, Society of Environmental Toxicology and Chemistry (SETAC) 14th Annual Meeting Europe, Czech, April(2004)
- 10) Masashi Hirano, Hiroshi Ishibashi, and Koji Arizono: Development of testing methods on endocrine disruptors using mysid shrimp *Americamysis bahia*, The 5th Japan-UK Research Cooperation Workshop, Kumamoto Terrsa, Kumamoto, Japan, February (2004)
- 11) Hiroshi Ishibashi, Naomi Matsumura, Masashi Hirano, and Koji Arizono: Feeding and preparing endocrine-disrupting chemicals free food, The 3rd International Medaka Symposium-Development of Testing Methods with Medaka to Detect Endocrine Disrupting Chemicals, Okazaki Conference Center, Okazaki, Japan, February (2003)