



25th ESCPB^{new} CONGRESS

September 7-11, 2008
Ravenna (Italy)

of the new
**European
Society
for
Comparative
Physiology
and
Biochemistry**

Programme

New challenges in integrative physiology and biochemistry:

from molecular mechanisms to environmental adaptation



**25th ESCPB^{new} Congress Ravenna
September 7-11, 2008**



Ravenna (Italy) capital of the Western Roman Empire in the fifth century, cradle of the Byzantine culture until the eighth century, and celebrated worldwide for its mosaics, welcomes the participants to the 25th Congress of the ^{new}European Society of Comparative Biochemistry and Physiology addressed to:

New challenges in integrative physiology and biochemistry: from molecular mechanisms to environmental adaptation

In consideration of the rapid scientific development, the ESCPB^{new} aims to conciliate traditional approaches in comparative biochemistry and physiology with the novel challenges in the field of Biological Sciences. Consequently, ESCPB^{new} is devoted to integrative and environmental physiology and biochemistry, by focussing on mechanisms of adaptation and acclimation to understand systems functioning. To achieve this goal, the ESCPB^{new} relies on a variety of approaches ranging from classical methodologies to genomics, proteomics and metabolomics. In this way the society intends to provide a forum for interaction between basic science and applied research areas such as ecotoxicology, aquaculture and climate and biodiversity changes.

Scientific session topics at the 25th ESCPB^{new} Congress are

- ❖ Physiology and toxicology of endocrine regulation including intracellular responses
- ❖ Aquaculture: the contribution of Comparative Biochemistry and Physiology
- ❖ Cellular homeostasis and the Environment: towards a better Understanding of Interactions of Multiple Stressors
- ❖ Cellular homeostasis and the Environment: special session on Cryptobiosis
- ❖ Genomics and proteomics: How can these contribute to Comparative Physiology and to understanding the impact of environmental stressors?
- ❖ Developmental physiology: Modulation of intrinsic patterns by extrinsic factors
- ❖ Further original contributes to the field of Comparative Biochemistry and Physiology are included in a miscellaneous session.

A satellite symposium on Mussel Genomics is also hosted, to further support the scientific dialogue towards new frontiers.

To help integrate our studies into the work of the wide community of integrative and environmental physiologists and biochemists, leading scientists were invited to present the state of art and most recent advances in the different fields they are involved in:

Bernd Pelster, University of Innsbruck, Austria (Plenary Lecture)

J. Kevin Chipman, University of Birmingham, United Kingdom

Giovanna Marino, ICRAM, Rome, Italy

Thomas W. Moon, University of Ottawa, Canada

Ralf J. Sommer, University Tübingen, Germany

Sjoerd Wendelaar Bonga, University of Nijmegen, The Netherlands

To support the integration of young researchers into the Society and acknowledge their contributions to science, twelve applications from all over the world, from Russia to Brazil, from Australia to Chile, and Europe were granted.

The contributions included in this volume are a collection of the abstracts presented at the Congress and reviewed by the Scientific committee. We hope they serve as a summary of most recent progresses in our field and stimulate further researches. We also hope the Congress itself is an occasion to promote scientific discussions and integrations amongst scientists.

Elena Fabbri
on behalf of the Scientific and Organizing Committees of the 25th ESCPB^{new} Congress

ORGANIZATION

Congress Organiser

Elena Fabbri, University of Bologna at Ravenna

Scientific Committee

Ronny Blust, University of Antwerp, Belgium

Miren P. Cajaraville, University of the Basque Country, Spain

Reihnard Dallinger, University of Innsbruck, Austria

Elena Fabbri, University of Bologna, Italy

Mikko Nikinmaa, University of Turku, Finland

Helmut Segner, University of Berna, Switzerland

Rita Triebskorn, University of Tuebingen, Germany

Roy Weber, University of Aarhus, Denmark

Aldo Viarengo, University of Piemonte Orientale, Italy

Local organizing committee

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Silvia Franzellitti, University of Bologna at Ravenna

Naimj Gambi, University of Bologna at Ravenna

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Emilio Carpenè, University of Bologna

Lanfranco Masotti, University of Bologna

Vittorio Tomasi, University of Bologna

Secretariat

Carla Rossi, Fondazione Flaminia

Simona Marsico, CIRSA Ravenna

PROGRAMME

Sunday, September 7th

- 15.00-16.30 Registration
- 16.30 - 17.00 Opening ceremony of the 25th ESCPB^{new} Congress
- 17.00 – 18.00 *Opening Lecture: (Introduced by R. Dallinger)*
“Hypoxia during development of the zebrafish – signalling and effects”
B. Pelster, R. Kopp, M. Egg (University of Innsbruck, Austria)
- 18.00-19.30 Visit at byzantine mosaics
- 19.30 Visit at the exhibition *Otium* and Welcome Buffet at “Chiostrì di San Nicolò”

Monday, September 8th

- 9.00-9.40 **Physiology and toxicology of endocrine regulation including intracellular responses**
SESSION OPENING LECTURE: *(Introduced by E. Fabbri)*
“Emerging toxicants as endocrine disruptors: what are the issues?”
T.W. Moon (University of Ottawa, Canada)
- 9.40-10.50 Oral Communications: **Physiology and toxicology of endocrine regulation including intracellular responses**
(Chairpersons: H. Segner, A. Viarengo)
- 10.50- 11.20 Coffee Break
- 11.20- 12.45 Oral Communications: **Physiology and toxicology of endocrine regulation including intracellular responses**
(Chairpersons: H. Segner, T.W. Moon)
- 12.45-13.45 Lunch
- 13.45-14.45 Discussion of Posters
- 14.45-15.25 **Aquaculture: the contribution of comparative biochemistry and physiology**
SESSION OPENING LECTURE: *(Introduced by E. Fabbri)*
“Water quality in aquaculture and its influence on stress physiology and welfare of farmed fish”
G. Marino (ICRAM - Central Institute for Marine Research, Rome, Italy)
- 15.25-17.00 Oral Communications: **Aquaculture: the contribution of comparative biochemistry and physiology**
(Chairpersons: R. Blust, G. Marino)
- 17.00-17.30 Coffee Break

17.30-19.00 Oral Communications: Special session on **Cryptobiosis**
(Chairpersons: R. Schill, R Weber)

20.00 **Ravenna, its flavours: dinner at Cà de ven**

Tuesday, September 9th

9.00-9.40 **Cellular homeostasis and the environment: towards a better understanding of interactions of multiple stressors**
SESSION OPENING LECTURE: (Introduced by M. P. Cajaraville)
“The modulating effect of individual differences on the impact of multiple stressors on homeostasis”
S.E.Wendelaar Bonga, (Radboud University, Nijmegen, The Netherlands)

9.40-10.50 Oral Communications: **Cellular homeostasis and the environment: towards a better understanding of interactions of multiple stressors**
(Chairpersons: R. Triebkorn, M.P. Cajaraville)

10.50-11.20 Coffee Break

11.20- 12.45 Oral Communications: **Cellular homeostasis and the environment: towards a better understanding of interactions of multiple stressors**
(Chairpersons: R. Triebkorn, S. Wendelaar Bonga)

12.45-13.45 Lunch

13.45-14.45 Discussion of Posters

14.45-16.00 Oral Communications: **Cellular homeostasis and the environment: towards a better understanding of interactions of multiple stressors**
(Chairpersons: M.P. Cajaraville, R. Dallinger)

16.00- 16.30 Coffee Break

16.30-18.00 **ESCPB Meeting**

20.00 Social Dinner

Wednesday, September 10th

9.00-9.40 **Genomics and proteomics: how can these contribute to comparative physiology and to understanding the impact of environmental stressors?**
SESSION OPENING LECTURE: (Introduced by A. Viarengo)
“Toxicogenomics as an “open” system to detect tissue-specific responses to toxicants: nanoparticles as a proof of principle in fish”
J.K. Chipman, T.D. William (University of Birmingham, UK)

- 9.40-10.50 Oral Communications: **Genomics and proteomics: how can these contribute to comparative physiology and to understanding the impact of environmental stressors?**
(Chairpersons: R. Blust, A. Viarengo)
- 10.50- 11.20 Coffee Break
- 11.20- 12.30 Oral Communications: **Genomics and proteomics: how can these contribute to comparative physiology and to understanding the impact of environmental stressors?**
(Chairpersons: R. Blust, J.K. Chipman)
- 12.30-13.30 Lunch
- 13.30-14.30 Discussion of Posters
- 14.30-15.10 **Developmental physiology: modulation of intrinsic patterns by extrinsic factors**
SESSION OPENING LECTURE: (Introduced by R. Triebskorn)
“Physiological, morphological and genomic innovations during the evolution of nematode parasitism – Pristionchus pacificus as a case study”
R. J. Sommer (Univ. of Tübingen, Germany)
- 15.10- 16.35 Oral Communications: **Developmental physiology: modulation of intrinsic patterns by extrinsic factors**
(Chairpersons: R. Dallinger, R.J. Sommer)
- 16.35-17.00 Coffee Break
- 17.00-19.00 Round table on **Mussel genomics** (Organized by F. Dondero and I. Cancio)

Thursday, September 11th

- 8.30 Visit at S. Apollinare in Classe and San Marino.

DAILY PROGRAMME

Sunday, September 7th

- 15.00-16.30 Registration
- 16.30 - 17.00 Opening ceremony of the 25th ESCPB^{new} Congress
- 17.00 – 18.00 OPENING LECTURE: (Introduced by R. Dallinger)
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B. PELSTER, R. KOPP, M. EGG
- 18.00-19.30 Visit at byzantine mosaics
- 19.30 Visit at the exhibition *Otium* and Welcome Buffet at “Chiostri di San Nicolò”

Monday, September 8th

- 9.00-9.40 Physiology and toxicology of endocrine regulation including intracellular responses**
SESSION OPENING LECTURE: (Introduced by E. Fabbri)
“Emerging toxicants as endocrine disruptors: what are the issues?”
T.W. MOON

- 9.40-10.50 Oral Communications: Physiology and toxicology of endocrine regulation including intracellular responses**
(Chairpersons: H. Segner, A. Viarengo)

Multidrug resistance transporter in the midgut gland and the brain of crustaceans. U. BICKMEYER, A.-K. LÜDERS, R. SABOROWSKI.

Modulation of the MXR response and cyclic AMP pathway in the Mediterranean mussel exposed to contaminant mixtures. S. FRANZELLITTI, E. FABBRI, A. CAPUZZO, A. VIARENGO.

Effects of the organophosphate pesticide chlorpyrifos on the responses of *Mytilus* digestive gland to the natural estrogen 17 β -Estradiol. L. CANESI, C. BORGHI, G. GALLO, F. CAPRÌ, A. VIARENGO, F. DONDERO.

Mixture activity of three estrogenic UV-filters in fish (*Pimephales promelas*). P.Y. KUNZ, K. FENT.

CYP19A and B gene expression and activity in roach (*Rutilus rutilus*). C. MINIER, P. GÉRAUDIE, C. BOULANGÉ-LECOMTE, M. GERBRON, F. BRION, N. HINFRAY, J.-M. PORCHER, E.M. HILL, J. ROTCHEL.

Identification of estrogen receptors in rainbow trout immune cells. A. NAKAYAMA, E. OLDENBERG, H. SEGNER, E. EPPLER, B. KÖLLNER.

10.50- 11.20

Coffee Break

11.20-12.45

Oral Communications: **Physiology and toxicology of endocrine regulation including intracellular responses**

(Chairpersons: H. Segner, T.W. Moon)

Endocrine disruption in mussel populations from the Biosphere's Reserve of Urdaibai (North Iberian Peninsula). M. ORTIZ-ZARRAGOITIA, M.P. CAJARAVILLE.

Effect of cortisol on vitellogenin synthesis in the primary hepatocyte culture of African catfish, *Clarias gariepinus*. R. PHARTYAL, S.V. GOSWAMI, N. SEHGAL.

Bidder's organ in the male toad *Bufo arenarum*. M.F. SCAIA, E. REGUEIRA, N.R. CEBALLOS.

Impact of estrogenic active substances on the developing immune system of rainbow trout (*Oncorhynchus mykiss*). M. WENGER, H. SEGNER.

Evaluation of a battery of biomarkers and other physiological responses to assess the toxicity of environmental carbamazepine concentrations in the mussel *Mytilus galloprovincialis*. M.L. MARTIN-DIAZ, S. FRANZELLITTI, S. BURATTI, E. FABBRI.

Organophosphate-resistant acetylcholinesterase in *Mytilus galloprovincialis*: identification of a resistance Ace gene in cerebral ganglion, gills and adductor muscle. F. NARDI, F. FRATI, R. ROMANI, G. ROSI, I. CORSI, S. FOCARDI.

Closely related crabs from opposite niches adopt different mechanisms to adjust oxygen transport. F. GIOMI, N. HELLMAN, H. DECKER, M. BELTRAMINI.

12.45-13.45

Lunch

13.45-14.45

Discussion of Posters: **Physiology and toxicology of endocrine regulation including intracellular responses**

- P1 Activation of 5-HT(1A) receptor induces glycogenolysis in the rainbow trout brain (*Oncorhynchus mykiss*).** T. GONZÁLEZ, J.J. PÉREZ-MACEIRA, M.J. MANCEBO, M. ALDEGUNDE.
- P2 Changes in the ecdysone response pathway after exposure to different endocrine-disrupting chemicals in the aquatic larvae of *Chironomus riparius*.** J.L. MARTINEZ-GUITARTE, R. PLANELLÓ, G. MORCILLO.
- P3 Changes on corticosterone and metabolic levels in buff-breasted sandpiper *Tryngites subruficollis* (Charadriiforme, Scolopacidae) during stay in wintering site at Brazil.** A.F. PINTO, B.K. DUTRA, F. POERSCHKE, J.R.R. ROSSONI, J.R. GONÇALVES, A.L.F. CHITTÓ, C.S. FONTANA, G.T. OLIVEIRA.

- P4 Identification and validation of endogenous reference genes for biomarker expression profiling in abalone under endocrine disrupting chemicals (EDCs) exposure by quantitative real-time RT-PCR.** Q. WAN, S.-K. LEE, J. LEE.
- P5 Cadmium influence on the Stannius Corpuscles and ionic plasmatic concentration of *Liposarcus anisitsi* (Pisces, Siluriformes, Loricariidae).** M. BITTENCOURT, Y. TEDESCO.
- P6 Inhibitory effect of selected serotonin 5-HT1 and 5-HT2 receptor agonists on food intake in rainbow trout.** T. GONZÁLEZ, M.J. MANCEBO, J.J. PÉREZ-MACEIRA, M. ALDEGUNDE.
- P7 Signal transduction induced by Cd or Zn as measured by protein carbonylation and glutathionylation in *Mytilus galloprovincialis* haemocytes.** A. TZELOU, E. PATETSINI, ST. DAILIANIS, M. KALOYIANNI.
- P8 The role of neuron-restrictive silencer factor in modulating the Sp-1 mediated transactivation of human secretin receptor gene.** L.T.O. LEE, P.Y. YUAN, B.K.C. CHOW.
- P9 Response to short term ultraviolet stress in the reef-building coral *Pocillopora capitata*.** M. LIÑÁN-CABELLO, L. FLORES-RAMÍREZ, A. MENA-HERRERA, J. F. COBO-DÍAZ, T. ZENTENO-SAVIN, N. OLGUIN-MONROY.
- P10 Modulation of rhodopsin expression in a fish and a mammalian pigment cell line: mechanisms of endothelin signalling.** G.J.D. LOPES, M. A. VISCONTI, A.M.L. CASTRUCCI.
- P11 Protection mechanisms against oxidative stress in *Mytilus galloprovincialis*.** E. GOURGOU, A. MELETIOU, I. BEIS, C. GAITANAKI.
- P12 Signal transduction in phagocytosis of the compound ascidian *Botryllus schlosseri*.** A. MENIN, M. BETTI, L. BALLARIN.
- P13 Effects of 5-HT2 receptor ligands on the brain glycogen metabolism of the rainbow trout (*Oncorhynchus mykiss*).** J.J. PÉREZ-MACEIRA, M.J. MANCEBO, T. GONZÁLEZ, R. WEBER, M. ALDEGUNDE.
- P14 Serotonin, glycemia and brain glycogenolysis in rainbow trout (*Oncorhynchus mykiss*).** J.J. PÉREZ-MACEIRA, M.J. MANCEBO, R. WEBER, T. GONZÁLEZ, M. ALDEGUNDE.
- P15 Analysis of acetylcholine interactions with system of regulatory peptides.** A.A. NIKOLAEVA, S.V. KOROLEVA.

Discussion of Posters: **Aquaculture: the contribution of comparative biochemistry and physiology**

- P16 Linking environmental stress and physiological energetics in mussels.** U. ARAMBALZA, N. ERRASTI, I. IBARROLA, M.B. URRUTIA.

- P17 Potential antioxidant effect of essential oil of *Ocinum basilicum* in liver of *Dicentrarchus labrax*.** M. BLASI, E. MERRA, F. CICCONE, G. CENTODUCATI, E. CASALINO.
- P18 Functional response of mussels to bacterial challenge.** C. CIACCI, M. BETTI, P. ROCH, R. FABBRI, C. BORGHI, L. CANESI.
- P19 Plasma total oxidant/antioxidant status in *Dicentrarchus labrax* after exposure to experimental hypoxia, hyperoxia and hypercapnia.** P. DI MARCO, A. PRIORI, M.G. FINOIA, T. PETOCHI, G. MARINO, G. LEMARIÉ, M. ALEXIS, A. ALBERTI, D. MACCIANTELLI.
- P20 Effects of cortisol implant on innate and acquired immunity in sea bass *Dicentrarchus labrax*.** L.T. PETOCHI, P. DI MARCO, A. PRIORI, M.G. FINOIA, G. MARINO, G. BREUIL, H. SUNDH, K. SUNDELL, E. CACCIA, N. ROMANO.
- P21 Two isoforms of type I interferon gene isolated from the common carp *Cyprinus carpio* L.** Y. KITAO, T. KONO, M. SAKAI.
- P22 Immunolocalization of glucokinase in glucosensing tissues of rainbow trout.** S. POLAKOF, A. AGUILAR, M. GESTO, J.M. MÍGUEZ, J.L. SOENGAS.
- P23 Relation between pH and enzyme expression in the midgut gland of the brown shrimp *Crangon crangon*.** R. SABOROWSKI, U. BICKMEYER, C. SAHLMANN.
- P24 Detection of yellow head disease in intensive freshwater production systems of *Litopenaeus vannamei*.** M. SÁNCHEZ-BARAJAS, M. LIÑÁN-CABELLO, A. MENA-HERRERA.
- P25 Sex differentiation and serum levels of sex steroids in Meagre (*Argyrosomus regius*).** R. SCHIAVONE, L. ZILLI, S. VILELLA.
- P26 Interindividual differences in physiological rates underly fast and slow growth of mussel seeds fed variable rations.** D. TAMAYO, I. IBARROLA, M.B. URRUTIA, E. NAVARRO.
- P27 Effect of the anaesthetics clove oil and MS-222 on blood and plasma indicators of stress in the Senegalese sole (*Solea senegalensis* Kaup 1858).** R. A. WEBER, J. J. PÉREZ-MACEIRA, J. B. PELETEIRO, O. GARCÍA MARTÍN, M. ALDEGUNDE.
- P28 Physiological stress responses in Senegalese sole (*Solea senegalensis* Kaup 1858) induced by acute exposure to exogenous ammonia.** R.A. WEBER, J.J. PÉREZ-MACEIRA, J.B. PELETEIRO, L.O. GARCÍA MARTÍN, M. ALDEGUNDE.
- P29 Expression of aquaglyceroporin in spermatozoa of two marine fish (*Sparus aurata* and *Dicentrarchus labrax*).** L. ZILLI, R. SCHIAVONE, C. STORELLI, S. VILELLA.
- P30 Toxicological investigation of the red-tide forming Raphidophyta *Fibrocapsa japonica* (Northern Adriatic).** L. PEZZOLESI, F. GUERRINI, P. GALLETTI, E. TAGLIAVINI, R. PISTOCCHI .

- P31** Antioxidant status of the red alga *Gracilaria vermiculophylla* from the Russian Pacific coast and its susceptibility to high light. I. YAKOVLEVA.

Discussion of Posters: **Cryptobiosis**

- P32** Proteomic analysis of cryptobiotic tardigrade *Milnesium tardigradum* and differential analysis of tardigrades in active and tun stage. E. SCHOKRAIE, T. KEMPF, U. WARNKEN, M. SCHNÖLZER, R.O. SCHILL.
- P33** New insights into anhydrobiotic organisms: perspectives for preservation and stabilization of biological material. M. GROHME, M. FROHME, M. SCHNÖLZER, T. DANDEKAR, D. REUTER, R.O. SCHILL.
- P34** Characterization of cyclomorphic stages in the marine tardigrade *Halobiotus crispae*. K. HALBERG ,H. RAMLØV, P. WESTH , D. PERSSON & N. MØBJERG.
- P35** Trehalose as protecting agent in aquatic invertebrates during dormancy induced by desiccation. S. HENGHERR, A.G. HEYER, F. BRÜMMER, R.O. SCHILL.
- P36** Dormancy of cells and organisms- strategies for survival and preservation – Sleeping Beauty. E. LUBZENS, O. HADAS, A. SUKENIK, J. CERDÀ, S. HOHMANN, R. WORLAND, M.S. CLARK, R. REINHARDT, K. FOG NIELSEN.
- P37** Comparative studies on storage cells in tardigrades during starvation and anhydrobiosis. A. REUNER, S. HENGHERR, F. BRÜMMER, R.O. SCHILL.
- P38** Heat shock protein response during estivation in the Mediterranean Grunt Snail (*Cantareus apertus*). R.O. SCHILL, A. REUNER, F. BRÜMMER.
- P39** Differential gene expression in the tardigrade *Milnesium tardigradum* during anyidrobiosis. M. GROHME, B. MALI, M. FROHME, M. SCHNÖLZER, T. DANDEKAR, D. REUTER, R.O. SCHILL.

14.45-15.25

Aquaculture: the contribution of comparative biochemistry and physiology

SESSION OPENING LECTURE: (Introduced by E. Fabbri)

“Water quality in aquaculture and its influence on stress physiology and welfare of farmed fish”

G. MARINO

15.25-17.00

Oral Communications: **Aquaculture: the contribution of comparative biochemistry and physiology**

(Chairpersons: R. Blust, G. Marino)

New insights into the regulation of expression and biological activity of myostatin in fish: lessons from sea bream. B. FUNKENSTEIN, Y. REBHAN, V. BALAS, A. PLIATNER, T. SKOPAL, E. NADJAR-BOGER, S.-J. DU.

Quantification of glucocorticoid receptors cDNA through real time PCR in *Dicentrarchus labrax* following a stress simulating experiment. S. LIVI, P. DI MARCO, G. MARINO, G. LEMARIÉ, H. SUNDH, K. SUNDELL, B. CARDAZZO, A. MININNI, T. PATARNELLO

Interaction between gonadotrophin-releasing-hormone and melatoninergic systems in the European sea bass. A.SERVILI, P. HERRERA, J.A. MUÑOZ-CUETO, J.F. LÓPEZ-OLMEDA, F.J. SÁNCHEZ-VÁZQUEZ.

Saponin fractions from *Trigonella foenum-graecum* in the diet affect growth and expression of GH and IGF-1 encoding genes in tilapia (*Oreochromis niloticus*). W. K. B. KHALIL, T. STADTLANDER, G. FRANCIS, U. FOCKEN, K. BECKER, B. LEVAVI-SIVAN, Z. KEREM, H. DWEIK, M. QUTOB, S. ABU-LAFI.

Integration of photoperiod signals in the brain-pituitary-gonadal (BPG) axis in *Solea senegalensis*. F. CONFENTE, M.C. RENDÓN, J.A. MUÑOZ-CUETO, A. EL M'RABET, A. OUAROUR, L. BESSEAU, J. FALCÓN.

No significant effect of commercial and vegetarian diet on the cytochrome P450 system of farmed gilthead seabream *Sparus aurata*. A. M. PASTORE, I. CORSI, S. FOCARDI.

Detoxification of *Jatropha curcas* seed meal and its utilization as a protein source in fish diet. V. KUMAR, H.P.S. MAKKAR, K. BECKER
Digestive enzymes in decapod crustaceans. R. SABOROWSKI, U. BICKMEYER, L. ROJO ARREOLA, M.A. NAVARRETE DEL TORO, F.L. GARCÍA-CARRENO.

17.00-17.30

Coffee Break

17.30-19.00

Oral Communications: Special session on **Cryptobiosis**
(*Chairpersons: R. Schill, R Weber*)

Anhydrobiosis of yeasts: main intracellular reactions A. RAPOPORT.
Genes associated with dormancy in the monogonont rotifer *Brachionus plicatilis*. N.Y. DENEKAMP, M.A.S. THORNE, M.S. CLARK, M. KUBE, R. REINHARDT, E. LUBZENS.

Mechanisms and molecular adaptation to extreme dehydration in tardigrades: *Hsp* gene expression in *Milnesium tardigradum*. A. REUNER, F. BRÜMMER, R.O. SCHILL, J. ZANTKE, M. KUBE, H. KUHL, R. REINHARDT, B. MALI, M. FROHME, F. FÖRSTER, T. DANDEKAR.

Detection of DNA damage with single-cell gel electrophoresis in anhydrobiotic tardigrades. R.O. SCHILL, S. NEUMANN, A. REUNER, F. BRÜMMER.

Hsp levels and DNA integrity in anhydrobiotic tardigrades. R. GUIDETTI, T. ALTIERO, R. BERTOLANI, L. RIBECCHI.

Vitrification as a limiting factor for high temperature tolerance in tardigrades. S. HENGHERR, M.R. WORLAND, F. BRÜMMER, R.O. SCHILL.

Radiation tolerance in tardigrades: evidence and implications. K.I. JÖNSSON.

Physiological and molecular responses of killifish (*Fundulus heteroclitus*) embryos to water removal stress. J. CERDÀ, A. TINGAUD-SEQUEIRA, D. OTERO, C. ZAPATER, A. BECK, H. KUHL, J. KREUTZBERGER, M. KUBE, R. REINHARDT.

20.00 **Ravenna, its flavours: dinner at Cà de ven**

Tuesday, September 9th

9.00-9.40 **Cellular homeostasis and the environment: towards a better understanding of interactions of multiple stressors**
SESSION OPENING LECTURE: (*Introduced by M. P. Cajaraville*)
“The modulating effect of individual differences on the impact of multiple stressors on homeostasis”
S.E.WENDELAAR BONGA

9.40-10.50 Oral Communications: **Cellular homeostasis and the environment: towards a better understanding of interactions of multiple stressors**
(*Chairpersons: R. Triebeskorn, M.P. Cajaraville*)

Use of the land snail *Helix aspersa* as sentinel organism for monitoring ecotoxicological effects of atmospheric pollution in urban areas. S. GORBI, A. NOTTI, D. FATTORINI, R. BOCCHETTI, M. BENEDETTI, F. REGOLI.

Perfect adaptation to cope with metal stress and trace element homeostasis: metal specificity is a fundamental structural feature of snail metallothioneins. S. ATRIAN, A. PAGANI, M. CAPDEVILA, O. PALACIOS, M. EGG, M. HÖCKNER, R. DALLINGER.

Biochemical characterization of metallothionein isoforms in terrestrial snails: relationship between amino acid sequence and metal binding specificity. D. SCHULER, R. DALLINGER, F. HISPARD, A. DE VAUFLEURY.

Understanding the functioning of a gene: ability of the Cd-metallothionein of Roman snail (*Helix pomatia* L.) to cope with multiple environmental stress. R. DALLINGER, M. EGG, M. HÖCKNER, D. SCHULER.

Application of real-time RT-QPCR to develop new biomarkers for soil quality assessment. M. DE BOER, T. DE BOER, B. NOTA, M. TIMMERMANS, J. MARIËN, D. ROELOFS, N. VAN STRAALLEN.

Seasonal variability of the cytosolic metal and protein concentrations in three tissues of European chub of the same age. Z. DRAGUN, V. FILIPOVIĆ MARIJIĆ, M. PODRUG, B. RASPOR.

10.50- 11.20

Coffee Break

11.20- 12.45

Oral Communications: **Cellular homeostasis and the environment: towards a better understanding of interactions of multiple stressors** (*Chairpersons: R. Triebksorn, S. Wendelaar Bonga*)

Starvation can protect fish against waterborne copper exposure. G. DE BOECK, S. HASHEMI, P.S. KUNWAR, R. BLUST.

Feeding mice with diet made up with mercury-contaminated fish flesh from French Guiana: a model for the environmental poisoning of the Wayana Amerindians. J.-P. BOURDINEAUD, D. BRÉTHES, P. GONZALEZ, M. LACLAU, A. MARIGHETTO, R. MAURY-BRACHET, R. ROSSIGNOL, W. ROSTÈNE, M. FUJIMURA, M. SAWADA.

Human pharmaceuticals affect the multidrug resistance mechanism in fish cells. K. FENT, D. CAMINADA, V. CHRISTEN, R. ZAJA, T. SMITAL.

Sensitivity of Phase I and III drug metabolizing enzymes in monitoring petroleum hydrocarbon contamination using red mullet (*Mullus barbatus*, L. 1758) as sentinel species. C. DELLA TORRE, I. CORSI, T. CARUSO, G. PERRA, G. GUERRINI, S. FOCARDI.

Phase I biotransformation enzymes as suitable marker of exposure in the Mediterranean mussel and in Common sole to petroleum hydrocarbon contaminated site: field study. A. TRISCIANI, I. CORSI, G. PERRA, S. FOCARDI.

Correlation between peroxisome proliferation and upregulation of cytochrome P450 CYP4A and peroxisomal beta-oxidation fatty acyl CoA oxidases (AOX) in the koala (*Phascolarctos cinereus*). S.N.T. NGO, R.A. MCKINNON, I. STUPANS.

The physiological stress response to predators in the waterflea *Daphnia magna*. K. PAUWELS, R. STOKS, L. DE MEESTER.

12.45-13.45

Lunch

13.45-14.45

Discussion of Posters: **Cellular homeostasis and the environment: towards a better understanding of interactions of multiple stressors**

- P40** Extraction, separation and detection of benzo(a)pyrene and the impact on the photosynthetic parameters of *Gracilaria birdiae*. J.V. ALMEIDA, D. OLIVEIRA-SILVA, R.L. ROMANO, E.M. PLASTINO, P. COLEPICCOLO, E. MARINHO-SORIANO.
- P41** An ecotoxicological protocol with European eel, *Anguilla anguilla*, to assess the quality of marine sediments. M. BENEDETTI, S. GORBI, A. NOTTI, D. FATTORINI, R. BOCCHETTI, E. BURIOLI, F. REGOLI, F. SARTI.
- P42** Impact of the seasonal changes of the mussel digestive gland mass on the cytosolic metal and metallothionein concentrations. Z. DRAGUN, M. ERK, B. RASPOR, D. IVANKOVIĆ, J. PAVIČIĆ.
- P43** Combined effects of abiotic and biotic variables on the energy metabolism and metallothionein level of *Mytilus galloprovincialis*. M. ERK, D. IVANKOVIĆ, J. PAVIČIĆ.
- P44** Metabolic and molecular stress responses of the gilthead seabream *Sparus aurata* during long term exposure to increasing temperatures. K. FEIDANTSI, H.O. PÖRTNER, A. LAZOU, B. KOSTOGLU, B. MICHAELIDIS.
- P45** Molecular cloning and expression analysis of Gluttonous goby (*Chasmichthys gulosus*) liver cytochrome P450 1A (CYP1A) induced by PAHs (Beta-naphthoflavone, benzo(a)pyrene). Y. LEE, H. KIM, J. LEE.
- P46** Regulatory Volume Decrease (RVD) in Cnidarians. A. MARINO, R. MORABITO, G. LA SPADA.
- P47** Size and site differences in both phase I and II cytochrome P450 in *Mullus barbatus* from Southern Tyrrhenian Sea. L. PIRRERA, I. CORSI, A.M. PASTORE, C. DELLA TORRE, S. FOCARDI, F. PERDICHIZZI, A. PROFETA, B. BUSALACCHI, A. PERDICHIZZI, V. MICALÈ, P. RINELLI.
- P48** Physiological antioxidant responses against high environmental oxygen concentration: glutathione peroxidase from the Antarctic teleost *Trematomus eulepidotus*. G. SATTIN, G. SANTOVITO, A. CASSINI.
- P49** Immunohistochemistry of Stanniocalcin isoforms in fish tissues. V. SCHEIN, N. SILVA, D.M. POWER, A.V.M. CANARIO.
- P50** Cellular adaptation and recovery in response to heat stress in Mediterranean snails (*Xeropicta derbentina*, *Theba pisana* and *Ceruella virgata*). R. TRIEBSKORN, C. MAZZIA, Y. CAPOWIEZ, N. DITTBRENNER, A. ZUERN, H.-R. KOEHLER.
- P51** Differential gene expression in *Podarcis sicula* embryos developed under cadmium stress. F. TRINCHELLA, M. CANNETIELLO, P. SIMONIELLO, S. FILOSA, R. SCUDIERO.
- P52** Molecular aspects of iron acquisition and storage in the cold-adapted Antarctic Notothenioids. F. TRINCHELLA, M. RIGGIO, S. FILOSA, E. PARISI, R. SCUDIERO.

- P53** Hsp70 expression in a human trophoblast cell line and its modulation by environmental stress factors. P. VALBONESI, S. FRANZELLITTI, E. FABBRI, C. BIONDI, A. CONTIN.
- P54** Strategies of oxidative stress response in two Mexican endangered goodeid fish environmentally exposed to contamination gradients. A. VEGA-LÓPEZ, E. GARCÍA-LATORRE, M.L. DOMÍNGUEZ-LÓPEZ.
- P55** Application of an integrated biomarker response index (IBR) to assess the health status of mussels in the Basque coast (NE Iberian Peninsula). I. ZORITA, M. ORTIZ-ZARRAGOITIA, A. ORBEA, M. SOTO, I. MARIGÓMEZ, M.P. CAJARAVILLE.
- P56** Potential involvement of MDR1/ABCB1-like gene (P-glycoprotein) of the Mediterranean mussel *Mytilus galloprovincialis* in the heavy metal response: correlation with biotransformation phase II enzymes (GST and UDPGT), lysosomal membrane stability and Cr levels. S. ZUCCHI, I. CORSI, A. TRISCIANI, D. BARONI, S. FOCARDI.
- P57** Carbofuran induced alteration of the energy metabolism of *Hyaella castroi* (Crustacea, Amphipoda, Dogielinotidae). B.K. DUTRA, F.A. FERNANDES, A.L. LAUFFER, J.R. GONÇALVES, A.L.F. CHITTÓ, G.T. OLIVEIRA.
- P58** Melatonin and thyroxine as biomarkers of condition of white stork nestlings (*Ciconia ciconia*). E. KULCZYKOWSKA, M. KASPRZAK, M. CURIATA, H. KALAMARZ, M. NIETRZEBA, L. JERZAK, P. KAMINSKI.

Discussions of Posters: **Miscellaneous**

- P59** Effects of acute changes in salinity and temperature on routine metabolism and nitrogen excretion in zebrafish and gambusia. C. AGNISOLA, E. ULIANO, M. CATALDI, G. DE VICO.
- P60** pH measurements in midgut gland cells of crustaceans. U. BICKMEYER, A.-K. LÜDERS, R. SABOROWSKI.
- P61** Effect of toxicants on earthworm haemoglobin levels. A. CALISI, M.G. LIONETTO, T. SCETTINO.
- P62** Oxidative stress in the ecology and evolution of birds. D. COSTANTINI
- P63** Effect of heavy metal contamination on host plants and aphids. Detoxification capabilities of organisms. A. KAFEL, A. BABCZYŃSKA, J. GOSPODAREK, D. LACHOWSKA, A. NADGÓRSKA-SOCHA, G. WILCZEK.
- P64** Transfer of metals from plant to herbivore. Antioxidant response in organisms under metal exposure. A. KAFEL, A. BABCZYŃSKA, J. GOSPODAREK, D. LACHOWSKA, A. NADGÓRSKA-SOCHA, G. WILCZEK, M. HEFLIK.
- P65** A glycoprotein specifically accumulated in the ovarian cavity of viviparous teleost, *Neoditrema ransonneti* (Perciformes, Embiotocidae): a

- homolog of alpha-1-acid glycoprotein. O. NAKAMURA, Y. NOZAWA, E. SAITO, S. TSUTSUI.
- P66 Morphological examination and quantification of hepatic peroxisomes in the koala (*Phascolarctos cinereus*) by electron microscopy.** S.N.T. NGO, R.A. MCKINNON, I. STUPANS.
- P67 Tributyltin (TBT) effect on the mitochondrial F₀F₁ complex in the *Mytilus galloprovincialis* digestive gland.** A. PAGLIARANI, S. NESCI, V. VENTRELLA, F. TROMBETTI, M. PIRINI, A.R. BORGATTI.
- P68 Linking responses at different levels of biological organization: the effect on biomarkers and life cycle traits in the earthworm *Eisenia andrei* exposed to copper-spiked soils.** A. PASTERIS, N. GAMBI, S. GUERRINI, V. BANDINI, A. BUSCAROLI, E. DINELLI, E. FABBRI.
- P69 Automatic properties of the European common lizard, *Lacerta vivipara*, heart with special reference to the atrioventricular junction.** V. PROSHEVA.
- P70 Expression analysis of cyclooxygenase in the ovary of viviparous fish, *Neoditrema ransonneti* (Perciformes; Embiotocidae).** E. SAITO, O. NAKAMURA, H. YAMADA, S. TSUTSUI, T. WATANABE.
- P71 The study of drug-protein binding using hollow fibre supported liquid membranes.** A.M. MSAGATI.
- P72 Characterisation of the carbonic anhydrase cdnas from antarctic teleost *Trematomus bernacchii* and mangrove teleost *Periophthalmus sobrinus*.** G. SATTIN, G. SANTOVITO, E. BERGANTINO, M. BELTRAMINI.
- P73 Seasonal intake responses in the nectar-feeding bat *Glossophaga soricina*.** J.E. SCHONDUBE, J. AYALA-BERDON.
- P74 2,4,6-trinitrotoluene (TNT) affects gill morphology in exposed fish.** C. SENSINI, C. DELLA TORRE, I. CORSI, S. FOCARDI.
- P75 Adaptive reduction in temperature dependence of hemoglobin-oxygen binding in a heterothermic fish (Blue marlin).** R.E. WEBER, A. FAGO.
- P76 A unique lectin identified in the cutaneous secretion of common skate (*Raja kenoyei*), a cartilaginous fish.** S. TSUTSUI, M. YAMAGUCHI, A. HIRASAWA, O. NAKAMURA, T. WATANABE.

14.45-16.00

Oral Communications : **Cellular homeostasis and the environment: towards a better understanding of interactions of multiple stressors**
(Chairpersons: M.P. Cajaraville, R. Dallinger)

Interactions of Mediterranean snail heat tolerance, heat-induced stress proteins and phenotypic variability: from ecophysiology to microevolution. H.-R. KOEHLER, R. LAZZARA, N. DITTBRENNER, U. GAERTNER, S. ROESLER, Y. CAPOWIEZ, C. MAZZIA, R. TRIEBSKORN.

Glycerol increase in rainbow smelt (*Osmerus mordax*) is triggered by low temperature but decrease is photoperiod dependent. W. DRIEDZIC, C. SHORT, K. CLOW, K.V. EWART.

Photoinhibition, non-photochemical quenching and UV-screening compounds in shallow-water scleractinian corals: consequences for susceptibility to natural sunlight. I. YAKOVLEVA, R. BHAGOLI.

Longevity of *Arctica islandica* in different populations: energy metabolism, antioxidant capacity and age pigment accumulation. L. BASOVA, S. BEGUM, J. STRAHL, E. PHILIPP, O. HEILMAYER, A. SUKHOTIN, T. BREY, D. ABELE.

Effects of prolonged anoxia on glycogen dynamics of the crucian carp. M. VORNANEN, J. HAVERINEN.

Cellular pathways of 2,4,6-trinitrotoluene (TNT) effects towards biotransformation responses and key neurosteroidogenic proteins in European eel (*Anguilla anguilla*). C. DELLA TORRE, I. CORSI, M. VALOTI, S. FOCARDI, A. ARUKWE, A.S. MORTENSEN.

16.00-16.30 Coffee Break

16.30-18.00 *ESCB Meeting*

20.00 Social Dinner

Wednesday, September 10th

9.00-9.40 **Genomics and proteomics: how can these contribute to comparative physiology and to understanding the impact of environmental stressors?**
SESSION OPENING LECTURE: (*Introduced by A. Viarengo*)
“Toxicogenomics as an “open” system to detect tissue-specific responses to toxicants: nanoparticles as a proof of principle in fish”
J.K. CHIPMAN, T.D. WILLIAM

9.40-10.50 Oral Communications: **Genomics and proteomics: how can these contribute to comparative physiology and to understanding the impact of environmental stressors?**
(*Chairpersons: R. Blust, A. Viarengo*)

Experimental and hybridisation design in microarray analysis: best practices. D. KNAPEN, K. LAUKENS, K. VAN DER VEN, W. DE COEN, R. BLUST.

Acclimatory responses of the *Daphnia pulex* proteome to changes in oxygen and temperature conditions. B. ZEIS, S. SCHWERIN, R. PIROW, T. LAMKEMEYER, R.J. PAUL.

Hypotonic stress alters expression of genes encoding transcription factors, protein homeostasis enzymes, mitochondrial proteins, and

transport proteins in gills of the euryhaline green crab (*Carcinus maenas*). D.W. TOWLE, N.B. TERWILLIGER, R.P. HENRY.

Transcriptomic approach to study the response to rapid changes of temperature in the hydrothermal vent mussel *Bathymodiolus azoricus*. I. BOUTET, A. TANGUY, D. LE GUEN, P. PICCINO, S. HOURDEZ, D. JOLLIVET, J. RAVAUX, B. SHILLITO.

Characterisation of genes involved in symbiosis between hydrothermal vent mussel *Bathymodiolus azoricus* and methanotrophic and sulfoxydant bacteria. I. BOUTET, A. TANGUY, F. H. LALLIER.

Hydrothermal vents and eukaryotic thermotolerance: profiling heat shock proteins expression in *Paralvinella sulfincola*. G. DILLY, P. GIRGUIS.

10.50- 11.20

Coffee Break

11.20-12.30

Oral Communications: **Genomics and proteomics: how can these contribute to comparative physiology and to understanding the impact of environmental stressors?**

(Chairpersons: R. Blust, J.K. Chipman)

Proteomic analyses in the detection of algal toxin contamination in shellfish and the characterization of molecular responses of human cells. G. RONZITTI, G.L. SALA, M. BELLOCCI, G.P. ROSSINI.

Proteomic effects of different Hg concentration in *Dictyostelium discoideum* amoebae. F. MARSANO, L. BOATTI, A. NEGRI, M. CIGAR, F. DONDERO, A. VIARENCO.

Monitoring of environmental soil contamination through transcriptomics. B. NOTA, N. VAN STRAALLEN, D. ROELOFS.

Cloning and expression of cancer related genes in turbot (*Scophthalmus maximus*) exposed to styrene and heavy fuel oil # 2. P. RUIZ, A. ORBEA, I. CANCIO, M. P. CAJARAVILLE.

The Power of the transcriptome: prognostic tool for populations of free-ranging bottlenose dolphins, *Tursiops truncatus*. A. MANCIA, G.W. WARR, J. ALMEIDA, R. WELLS, A. VELOSO, R.W. CHAPMAN.

12.30-13.30

Lunch

13.30-14.30

Discussions of Posters: **Genomics and proteomics: how can these contribute to comparative physiology and to understanding the impact of environmental stressors?**

P77 Differential tissue expression of uncoupling proteins in gilthead sea bream (*Sparus aurata* L.): lessons from UCP1 and UCP3 in fish. A. BERMEJO-NOGALES, A. SAERA-VILA, L. BENEDITO-PALOS, J.A. CALDUCH-GINER, J. PÉREZ-SÁNCHEZ.

- P78 Time series analyses of sea bream (*Sparus aurata* L.) stress response after confinement exposure.** J.A. CALDUCH-GINER, A. SAERA-VILA, M. CAIRNS, G. DAVEY, P. PRUNET, J. PÉREZ-SÁNCHEZ.
- P79 Disk abalone (*Haliotis discus discus*) CuZn-superoxide dismutase cDNA and its transcriptional induction by Aroclor 1254.** M. DE ZOYSA, H. KIM, J. LEE.
- P80 Heat shock proteins (Hsps), biomarkers of toxicity of xenobiotic agents?** M.C. GUIASOLA, E. DULIN, M.J. SÁNCHEZ, P. GARCÍA-BARRENO.
- P81 Gene characterization and expression analysis of peroxiredoxin 6 in disk abalone (*Haliotis discus discus*) by H₂O₂ oxidative stress and *Vibrio alginolyticus* infection.** C. NIKAPITIYA, Y.H. KIM, J. LEE.
- P82 Hypoxia stress in the pacific oyster *Crassostrea gigas*: a transcriptomic approach.** R. SUSSARELLU, D. MORAGA.
- P83 Study of the molecular response to thermal challenge of the hydrothermal annelid *Paralvinella grasslei*.** A. TANGUY, D. JOLLIVET, B. SHILLITO, O. LECOMPTE.
- P84 Development of a micro cell culture analogue for evaluation of chemical toxicity, called Tox Cell Chip.** C. VANPARYS, K. NIESCIEROWICZ, H. XU, M. SHULER, W. DE COEN, R. BLUST, J. ROBBENS.
- P85 How to quantify endosymbionts in the gills of the hydrothermal vent mussel *Bathymodiolus azoricus*? 3D-FISH versus qPCR.** I. BOUTET, A. TANGUY, F.H. LALLIER, S. HALARY, S. DUPERRON, F. GAILL.

Discussions of Posters: **Developmental physiology: Modulation of intrinsic patterns by extrinsic factors**

- P86 Temperature variations in relation to sex determination and plasma progesterone and estradiol levels during embryogenesis and post hatching in the green turtle, *Chelonia mydas*, at Ras Al-Hadd Reserve, Oman.** A.Y.A. ALKINDI, I. MAHMOUD, R. AL-OMAIRI, S.N. AL-BAHRY, I. AL-AMRI, T. KHAN.
- P87 Trophic niche modulate physiological specialization in digestive and renal traits: a field study of sparrows (*Zonotrichia capensis*) along a latitudinal gradient.** K. MALDONADO, G. CAVIERES, P. SABAT.

14.30-15.10 Developmental physiology: modulation of intrinsic patterns by extrinsic factors

SESSION OPENING LECTURE: (*Introduced by R. Triebskorn*)
 “Physiological, morphological and genomic innovations during the evolution of nematode parasitism- *Pristionchus pacificus* as a case study”
 R.J. SOMMER

15.10- 16.35 Oral Communications: Developmental physiology: modulation of intrinsic patterns by extrinsic factors

(Chairpersons: R. Dallinger, R.J. Sommer)

Effects of Stem Cell Factor (SCF) on proliferation and differentiation of bivalve immunocytes. M. BETTI, B. CANONICO, C. CIACCI, L.C. LORUSSO, S. PAPA, L. CANESI.

Growth potential in insects: effects of temperature on cellular proliferation at hormonal and molecular levels. L. LALOUETTE, D. RENAULT, D. SIAUSSAT, J. RAVAUX.

Heterogeneous expression of vitellogenin genes in marine teleosts: how maturational proteolysis of derivative yolk proteins determines the size and nature of the egg. R.N. FINN, J. KOLAREVIC, B.A. KRISTOFFERSEN.

Role of pontine neurons in central O₂ chemoreflex during development in bullfrogs (*Lithobates catesbeiana*). R. KINKEAD, S. FOURNIER.

Ion transport by the amphibian primary ureter. N. MØBJERG.

Can erythrocyte size affect the metabolic rate in the ontogeny of galliform birds? T. PIS.

Phenotypic plasticity as a correlate of metabolic scaling in teleosts. R.N. FINN Ø. SÆLE, K.A. PITTMAN.

16.35-17.00 Coffee break

17.00-19.00 Round table on **Mussel genomics** (Organized by F. Dondero and I. Cancio)

Participants:

R. BLUST (University of Antwerp)

I. CANCIO, M.P. CAJARAVILLE (University of the Basque Country)

J.K. CHIPMAN (School of Biosciences, The University of Birmingham)

J.A. CRAFT (Biological and Biomedical Sciences Glasgow Caledonian University)

F. DONDERO, A. NEGRI, A. VIARENGO (University of Piemonte Orientale)

S. FRANZELLITTI, E. FABBRI (University of Bologna at Ravenna)

B. LYONS (CEFAS, UK)

F. MIGNONE (University of Milan)

A. TANGUY, I. BOUTET (Equipe Evolution et Génétique des Populations Marines)

K.-E. TOLLEFSEN (Norwegian Institute for Water Research)

Thursday, September 11th

8.30 Visit at S. Apollinare in Classe and San Marino.

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KIM Y.H.	21	MACCIANTELLI	11
KINKEAD	22	MAHMOUD	21

MAKKAR	13	NIETRZEBA	17
MALDONADO	21	NIKAPITIYA	21
MALI	12; 13	NIKOLAEVA	10
MANCEBO	9; 10	NOTA	15; 20
MANCIA	20	NOTTI	14; 16
MARIËN	15	NOZAWA	18
MARIGHETTO	15	OLDENBERG	8
MARIGÓMEZ	17	OLGUIN-MONROY	10
MARINHO-SORIANO	16	OLIVEIRA	9; 17
MARINO	11; 12; 13; 16	OLIVEIRA-SILVA	16
MARSANO	20	ORBEA	17; 20
MARTIN-DIAZ	9	ORTIZ-ZARRAGOITIA	9; 17
MARTINEZ-GUITARTE	9	OTERO	14
MAURY-BRACHET	15	OUAROUR	13
MAZZIA	16; 18	PAGANI	14
MCKINNON	15; 18	PAGLIARANI	18
MELETIOU	10	PALACIOS	14
MENA-HERRERA	10; 11	PAPA	22
MENIN	10	PARISI	16
MERRA	11	PASTERIS	18
MICALE	16	PASTORE	13; 16
MICHAELIDIS	16	PATARNELLO	13
MÍGUEZ	11	PATETSINI	10
MINIER	8	PAUL	19
MININNI	13	PAUWELS	15
MØBJERG	12; 22	PAVIČIĆ	16
MOON	8	PELETEIRO	11
MORABITO	16	PERDICHIZZI	16
MORAGA	21	PÉREZ-MACEIRA	9; 10; 11
MORCILLO	9	PÉREZ-SÁNCHEZ	20; 21
MORTENSEN	19	PERRA	15
MSAGATI	18	PERSSON	12
MUÑOZ-CUETO	13	PETOSCHI	11
NADGÓRSKA-SOCHA	17	PEZZOLESI	11
NADJAR-BOGER	13	PHARTYAL	9
NAKAMURA	18	PHILIPP	19
NAKAYAMA	8	PICCINO	20
NARDI	9	PINTO	9
NAVARRETE DEL TORO	13	PIRINI	18
NAVARRO	11	PIROW	19
NEGRI	20	PIRRERA	16
NESCI	18	PIS	22
NEUMANN	14	PISTOCCHI	11
NGO	15; 18	PITTMAN	22
NIESCIEROWICZ	21	PLANELLÓ	9

PLASTINO	16	SÆLE	22
PLIATNER	13	SAERA-VILA	20; 21
PODRUG	15	SAHLMANN	11
POERSCHKE	9	SAITO	18
POLAKOF	11	SAKAI	11
PORCHER	8	SALA	20
PÖRTNER	16	SÁNCHEZ	21
POWER	16	SÁNCHEZ-BARAJAS	11
PRIORI	11	SÁNCHEZ-VÁZQUEZ	13
PROFETA	16	SANTOVITO	16; 18
PROSHEVA	18	SARTI	16
PRUNET	21	SATTIN	16; 18
QUTOB	13	SAWADA	15
RAMLØV	12	SCAIA	9
RAPOPORT	13	SCHEIN	16
RASPOR	15; 16	SCHETTINO	17
RAVAUX	20; 22	SCHIAVONE	11
REBHAN	13	SCHILL	12; 13; 14
REGOLI	14; 16	SCHNÖLZER	12
REGUEIRA	9	SCHOKRAIE	12
REINHARDT	12; 13; 14	SCHONDUBE	18
RENAULT	22	SCHULER	14; 15
RENDÓN	13	SCHWERIN	19
REUNER	12; 13; 14	SCUDIERO	16
REUTER	12	SEGNER	8; 9
RIBECCHI	14	SEHGAL	9
RIGGIO	16	SENSINI	18
RINELLI	16	SERVILI	13
ROBBENS	21	SHILLITO	20; 21
ROCH	11	SHORT	19
ROELOFS	15; 20	SHULER	21
ROESLER	18	SIAUSSAT	22
ROJO ARREOLA	13	SILVA	16
ROMANI	9	SIMONIELLO	16
ROMANO	11; 16	SKOPAL	13
RONZITTI	20	SMITAL	15
ROSI	9	SOENGAS	11
ROSSIGNOL	15	SOMMER	21
ROSSINI	20	SOTO	17
ROSSONI	9	STADTLANDER	13
ROSTÈNE	15	STOKS	15
ROTCHER	8	STORELLI	11
RUIZ	20	STRAHL	19
SABAT	21	STUPANS	15; 18
SABOROWSKI	8; 11; 13; 17	SUKENIK	12

SUKHOTIN	19	VILELLA	11
SUNDELL	11; 13	VISCONTI	10
SUNDH	11; 13	VORNANEN	19
SUSSARELLU	21	WAN	10
TAGLIAVINI	11	WARNKEN	12
TAMAYO	11	WARR	20
TANGUY	20; 21	WATANABE	18
TEDESCO	10	WEBER	10; 11; 18
TERWILLIGER	20	WELLS	20
THORNE	13	WENDELAAR BONGA	14
TIMMERMANS	15	WENGER	9
TINGAUD-SEQUEIRA	14	WESTH	12
TOWLE	20	WILCZEK	17
TRIEBSKORN	16; 18	WILLIAM	19
TRINCHELLA	16	WORLAND	12; 14
TRISCIANI	15; 17	XU	21
TROMBETTI	18	YAKOVLEVA	12; 19
TSUTSUI	18	YAMADA	18
TZELOU	10	YAMAGUCHI	18
ULIANO	17	YUAN	10
URRUTIA	10; 11	ZAJA	15
VALBONESI	17	ZANTKE	13
VALOTI	19	ZAPATER	14
VAN DER VEN	19	ZEIS	19
VAN STRAALLEN	15; 20	ZENTENO-SAVIN	10
VANPARYS	21	ZILLI	11
VEGA-LÓPEZ	17	ZORITA	17
VELOSO	20	ZUCCHI	17
VENTRELLA	18	ZUERN	16
VIARENGO	8; 20		