

Cellular Diagnostics: An Overview

June 16-21, 2003

Course Instructors:

Cheryl M. Woodley

Craig A. Downs

Section 1 Ecosystem Health

1. Coleman, J.S., S.A. Heckathorn, and R.L. Hallberg, *Heat-shock proteins and thermotolerance: linking molecular and ecological perspectives*. Trends in Ecology & Evolution, 1995. **10**(8): p. 305-306.
2. Odum, E.P., *Trends expected in stressed ecosystems*. BioScience, 1985. **35**(7): p. 419-422.
3. Schaeffer, D.J., *Diagnosing Ecosystem Health*. Ecotoxicology and Environmental Safety, 1996. **34**(1): p. 18-34.
4. Porth, C.M., *Chapter 8: Stress and Adaptation*, in *Pathophysiology: Concepts of Altered Health States*. 1994, J. B. Lippincott Company. p. 145-153.
5. Weed, D.L., *Environmental epidemiology: Basics and proof of cause-effect*. Toxicology, 2002. **181-182**: p. 399-403.

Section 2 Environmental Cellular Diagnostics

1. Moore, M.N., *Biocomplexity: the post-genome challenge in ecotoxicology*. Aquatic Toxicology, 2002. **59**(1-2): p. 1-15.
2. Depledge, M.H., *Chapter 2: The Conceptual Basis of the Biomarker Approach*, D.B.P.a.L.R. Shugart, Editor. 1993, Springer-Verlag: Berlin, Heidelberg.
3. Handy, R., Tamara S. Galloway, Michael H. Depledge, *A Proposal for the use of Biomarkers for the Assessment of Chronic Pollution and for Regulatory Toxicology*. Ecotoxicology, 2003. **12**: p. 331-343.
4. Eason, C. and K. O'Halloran, *Biomarkers in toxicology versus ecological risk assessment*. Toxicology, 2002. **181-182**: p. 517-521.
5. Adams, S.M., M. G. Ryon, *A Comparison of Health Assessment Approaches for Evaluating the Effects of Contaminant-Related Stress on Fish Populations*. Journal of Aquatic Ecosystem Health, 1994. **3**: p. 15-25.
6. Carjaraville, M.P., *The Use of Biomarkers to Assess the Impact of Pollution on Coastal Environments of the Iberian Peninsula: A Practical Approach*. The Science of the Total Environment, 2000. **247**: p. 295-311.
7. Khessiba, A., P. Hoarau, *Biochemical Response of the Mussel *Mytilus galloprovincialis* from Bizerta to Chemical Pollutant Exposure*. Archives of Environmental Contaminant Toxicology, 2001. **40**: p. 222-229.
8. Bierkens, J.G.E.A., *Applications and pitfalls of stress-proteins in biomonitoring*. Toxicology, 2000. **153**(1-3): p. 61-72.

9. Downs, C.A., J.E. Fauth, and C.M. Woodley, *Assessing the Health of Grass Shrimp (Palaeomonetes pugio) Exposed to Natural and Anthropogenic Stressors: A Molecular Biomarker System*. Marine Biotechnology, 2001. **3**.
10. Downs, C.A., et al., *A Molecular Biomarker System for Assessing the Health of Coral (Montastraea faveolata) During Heat Stress*. Marine Biotechnology, 2000. **2**(6): p. 533-544.
11. Dewailly, E., et al., *Indicators of Ocean and Human Health*. Canadian Journal of Public Health, 2002. **93**: p. S34-S38.
12. Risk, M.J., *Paradise Lost: How Marine Science Failed the World's Coral Reefs*. Marine and Freshwater Research, 1999. **50**: p. 831-837.

Section 3 Coral Cellular Physiology

1. Downs, C.A., et al., *Oxidative stress and seasonal coral bleaching*. Free Radical Biology and Medicine, 2002. **33**(4): p. 533-543.
2. Brown, B.E., et al., *Exploring the basis of thermotolerance in the reef coral Goniastrea aspera*. Marine Ecology Progress Series, 2002. **242**: p. 119-129.
3. Brown, B.E., et al., *Preliminary evidence for tissue retraction as a factor in photoprotection of corals incapable of xanthophyll cycling*. Journal of Experimental Marine Biology and Ecology, 2002. **277**(2): p. 129-144.
4. Fang, L.-s., S.-p. Huang, and K.-l. Lin, *High temperature induces the synthesis of heat-shock proteins and the elevation of intracellular calcium in the coral Acropora grandis*. Coral Reefs, 1997. **16**(2): p. 127-131.
5. Black, N.A., R. Voellmy, and A.M. Szmant, *Heat shock protein induction in Montastraea faveolata and Aiptasia pallida exposed to elevated temperatures*. Biological Bulletin, Marine Biological Laboratory, Woods Hole, 1995. **188**(3): p. 234-240.
6. Branton, M.A., et al., *Identification of a small heat shock/a-crystallin protein in the scleractinian coral Madracis mirabilis (Duch. and Mitch.)*. Canadian Journal of Zoology, 1999. **77**: p. 675-682.
7. Wiens, M., et al., *Induction of heat-shock (stress) protein gene expression by selected natural and anthropogenic disturbances in the octocoral Dendronephthya klunzingeri*. Journal of Experimental Marine Biology and Ecology, 2000. **245**(2): p. 265-276.
8. Kingsley, R.J., et al., *Expression of Heat Shock and Cold Shock Proteins in the Gorgonian Leptogorgia virgulata*. Journal of Experimental Marine Biology and Ecology, 2003. **296A**: p. 98-107.
9. Hawkrigde, J.M. and e.a. R. K. Pipe, *Localisation of Antioxidant Enzymes in the Cnidarians Anemonia viridis and Goniopora stokesi*. Marine Biology, 2000. **137**: p. 1-9.
10. Morgan, M.B. and T.W. Snell, *Characterizing stress gene expression in reef-building corals exposed to the mosquitocide dibrom*. Marine Pollution Bulletin, 2002. **44**(11): p. 1206-1218.

Section 4 Physiological Health

1. Ball, E.E., et al., *Coral development: from classical embryology to molecular control*. The International Journal of Developmental Biology, 2002. **46**(4): p. 671-678.
2. Twan, W.-H., J.-S. Swang, and C.-F. Chang, *Sex Steroids in Scleractinian Coral, Euphyllia ancora: Implications in Mass Spawning*. Biology of Reproduction, 2003. **68**: p. 2255-2260.
3. Bosch, T.C.G. and K. Khalturin, *Patterning and cell differentiation in Hydra: novel genes and the limits to conservation*. Canadian Journal of Zoology, 2002. **80**(10): p. 1670-1677.
4. Negri, A.P., et al., *Metamorphosis of broadcast spawning corals in response to bacteria isolated from crustose algae*. Marine Ecology Progress Series, 2001. **223**: p. 121-131.
5. Grimmelikhuijzen, C. and J. Westfall, *The nervous systems of cnidarians.*, in *The Nervous Systems of Invertebrates: An Evolutionary and Comparative Approach*, O. Breidbach and W. Kutsch, Editors. 1995, Birkhauser Verlag: Basel Switzerland. p. 7-24.
6. Koizumi, O., *Developmental neurobiology of hydra, a model animal of cnidarians*. Canadian Journal of Zoology, 2002. **80**(10): p. 1678-1689.
7. Grimmelikhuijzen, C.J.P., M. Williamson, and G.N. Hansen, *Neuropeptides in cnidarians*. Canadian Journal of Zoology, 2002. **80**(10): p. 1690-1702.
8. Medzhitov, R. and C. Janeway, *Innate Immunity*. The New England Journal of Medicine, 2000. **343**(5): p. 338-344.
9. Cooper, E.L., *Comparative Immunology*. Current Pharmaceutical Design, 2003. **9**: p. 119-131.
10. Ottaviani, E., S. Valensin, and C. Franceschi, *The neuro-immunological interface in an evolutionary perspective: the dynamic relationship between effector and recognition system*. Frontiers in Bioscience, 1998. **3**: p. 431-435.
11. Kasahara, S. and T.C.G. Bosch, *Enhanced antibacterial activity in Hydra polyps lacking nerve cells*. Developmental & Comparative Immunology, 2003. **27**(2): p. 79-85.

Section 5 Protein Metabolic Condition

1. Houry, W.A., *Chaperone-Assisted Protein Folding in the Cell Cytoplasm*. Current Protein and Peptide Science, 2001. **2**: p. 227-244.
2. Ciechanover, A., *The ubiquitin-proteasome pathway: on protein death and cell life*. EMBO Journal, 1998. **17**(24): p. 7151-7160.
3. Mimnaugh, E.G., P. Bonvini, and L. Neckers, *The measurement of ubiquitin and ubiquitinated proteins*. Electrophoresis, 1999. **20**: p. 418-428.
4. Hawkins, A.J.S., *Protein turnover: A functional appraisal*. Functional Ecology, 1991. **5**: p. 222-233.
5. Chang, T.-C., W.-Y. Chou, and G.-G. Chang, *Protein Oxidation and Turnover*. Journal of Biomedical Science, 2000. **7**: p. 357-363.

6. Dalle-Donne, I., et al., *Methionine oxidation as a major cause of the functional impairment of oxidized actin*. Free Radical Biology and Medicine, 2002. **32**(9): p. 927-937.

Section 6 Oxidative Stress and Response

1. DeZwart, L.L., et al., *Biomarkers of Free Radical Damage Applications in Experimental Animals and in Humans*. Free Radical Biology and Medicine, 1999. **26**(1/2): p. 202-226.
2. Janero, D.R., *Malondialdehyde and thiobarbituric acid-reactivity as diagnostic indices of lipid peroxidation and peroxidative tissue injury*. Free Radical Biology and Medicine, 1990. **9**(6): p. 515-540.
3. Esterbauer, H., R.J. Schaur, and H. Zollner, *Chemistry and biochemistry of 4-hydroxynonenal, malonaldehyde and related aldehydes*. Free Radical Biology and Medicine, 1991. **11**(1): p. 81-128.
4. Davies, K.J.A., *Protein Damage and Degradation by Oxygen Radicals I. General Aspects*. The Journal of Biological Chemistry, 1987. **262**(20): p. 9895-9901.
5. Davies, K.J.A., *Protein Damage and Degradation by Oxygen Radicals II. Modifications of Amino Acids*. The Journal of Biological Chemistry, 1987. **262**(20): p. 9902-9907.
6. Davies, K.J.A., *Protein Damage and Degradation by Oxygen Radicals III. Modification of Secondary and Tertiary Structure*. The Journal of Biological Chemistry, 1987. **262**(20): p. 9908-9913.
7. Davies, K.J.A., *Protein Damage and Degradation by Oxygen Radicals IV. Degradation of denatured proteins*. The Journal of Biological Chemistry, 1987. **262**(20): p. 9914-9920.
8. Robinson, C.E., et al., *Determination of Protein Carbonyl Groups by Immunoblotting*. Analytical Biochemistry, 1999. **266**: p. 48-57.
9. Kono, Y. and I. Fridovich, *Superoxide Radical Inhibits Catalase*. The Journal of Biological Chemistry, 1982. **257**(10): p. 5751-5754.
10. Bowler, *Superoxide dismutase and stress tolerance*. Annual Review of Plant Physiology, 1992. **43**: p. 83-116.
11. Schwartsburd, P.M., *Self-cytoprotection against stress: feedback regulation of heme-dependent metabolism*. Cell Stress & Chaperones, 2001. **6**(1): p. 1-5.

Section 7 Xenobiotic Damage and Detoxification

1. Lindstrom-Seppa, P., et al., *Biochemical Responses in Aquatic Plants as Markers of Environmental Contamination*. ATLA, 2001. **29**: p. 277-282.
2. Sies, H., *Glutathione and its role in cellular functions*. Free Radical Biology and Medicine, 1999. **27**(9-10): p. 916-921.
3. Ketterer, B., *A bird's eye view of the glutathione transferase field*. Chemo-Biological Interactions, 2001. **138**(1): p. 27-42.

4. Sauna, Z.E., et al., *The Mechanism of Action of Multidrug-Resistance-Linked-P-Glycoprotein*. Journal of Bioenergetics and Biomembranes, 2001. **33**(6): p. 481-491.
5. Bard, S.M., *Multixenobiotic resistance as a cellular defense mechanism in aquatic organisms*. Aquatic Toxicology, 2000. **48**: p. 357-389.

Section 8 Metal Homeostasis

1. Klaassen, C.D., J. Liu, and S. Choudhuri, *Metallothionein: An Intracellular Protein to Protect Against Cadmium Toxicity*. Annual Review of Pharmacology and Toxicology, 1999. **39**: p. 267-294.
2. Ye, B., W. Maret, and B.L. Vallee, *Zinc Metallothionein Imported into Liver Mitochondria Modulates Respiration*. Proceedings of the National Academy of Science USA, 2001. **98**(5): p. 2317-2322.
3. Tang, W., et al., *Measurement of Cadmium-Induced Metallothionein in Urine by ELISA and Prevention of Overestimation Due to Polymerization*. Journal of Analytical Toxicology, 1999. **23**: p. 153-158.
4. Carginale, V., et al., *Cadmium-induced differential accumulation of metallothionein isoforms in Antarctic icefish, which exhibits no basal metallothionein protein but high endogenous mRNA levels*. Biochemical Journal, 1998. **332**: p. 475-481.

Section 9 Intracellular-Endocrine Homeostasis

1. Betti, L., et al., *Studies of peripheral benzodiazepine receptors in mussels: comparison between a polluted and a nonpolluted site*. Ecotoxicology and Environmental Safety, 2003. **54**(1): p. 36-42.
2. Casellas, P., S. Galiegue, and A.S. Basile, *Peripheral Benzodiazepine Receptors and Mitochondrial Function*. Neurochemistry International, 2002. **40**: p. 475-486.

Section 10 Metabolism, Mitochondria and Cell Stress Physiology

1. Robertson, J.D. and S. Orrenius, *Role of mitochondria in toxic cell death*. Toxicology, 2002. **181-182**: p. 491-496.
2. Pedersen, P.L., *Mitochondrial Events in the Life and Death of Animal Cells: A Brief Overview*. Journal of Bioenergetics and Biomembranes, 1999. **31**(4): p. 291-304.
3. Salvemini, F., et al., *Enhanced Glutathione Levels and Oxidoreistance Mediated by Increased Glucose-6-Phosphate Dehydrogenase Expression*. The Journal of Biological Chemistry, 1999. **274**(5): p. 2750-2757.

Section 11 Genomic Integrity

1. Norbury, C.J. and I.D. Hickson, *Cellular Responses to DNA Damage*. Annual Review of Pharmacology and Toxicology, 2001. **41**: p. 367-401.
2. Shuker, D.E.G., *The Enemy at the Gates? DNA Adducts as Biomarkers of Exposure to Exogenous and Endogenous Genotoxic Agents*. Toxicology Letters, 2002. **134**: p. 51-56.
3. Lu, A.-L., et al., *Repair of Oxidative DNA Damage*. Cell Biochemistry and Biophysics, 2001. **35**: p. 141-170.
4. Kow, Y.W. and A. Dare, *Detection of Abasic Sites and Oxidative DNA Base Damage Using an ELISA-like Assay*. Methods, 2000. **22**(2): p. 164-169.
5. Peccia, J. and M. Hernandez, *Rapid Immunoassays for Detection of UV-Induced Cyclobutane Pyrimidine Dimers in Whole Bacterial Cells*. Applied and Environmental Microbiology, 2002. **68**(5): p. 2542-2549.
6. Stewart, S.A. and R.A. Weinberg, *Senescence: Does It All Happen at the Ends?* Oncogene, 2002. **21**: p. 627-630.