**UW Medicine - Pathology**

400-09-01-11

Pathology Resident Rotation in Cytogenetics Policy

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| Adopted Date: 05/2004  Review Date: 06/2006  Revision Date: 05/03/11, 10/14/2013 |

PURPOSE

During a 2-week or more rotation, residents will obtain knowledge of the types of specimens routinely submitted for Cytogenetics diagnosis, including fluorescence in situ hybridization (FISH). In addition, residents will acquire knowledge of Cytogenetics nomenclature and chromosome structure. Note: Madigan Army Medical Center Resident training is outlined in the Educational Agreement which is drafted by Madigan AMC for the next academic year. A copy of this agreement is kept in the lab manual hard copy after this section.

POLICY

Two weeks minimum

1. **Participate in sign-out daily (~ noon to 5 p.m.) including:**
   1. Review of between 5-10 files of cases being signed out by director.
   2. Review of 2-3 karyotypes, 2-3 drawings on photographs and of appropriate completion of cell counts for each case.
   3. Learn the basic principles of cytogenetic nomenclature (ISCN 2009) to formulate final diagnosis.
   4. Learn about indications for cytogenetic tests.
   5. Learn about types of aberrations described
   6. Learn about risks to the patient or his (her) family of carrying a chromosomal anomaly.
      1. **Learn basics of the methods used for cytogenetics diagnoses.**
         1. Learn about the methods of obtaining and sending samples for cytogenetics analysis.
         2. Observe the culture set-up, harvest and microscopic analyses of the different tissue types: amniotic fluid, blood, bone marrow, solid tissue samples.
         3. Set-up his (her) own blood culture, harvest it and do the microscopic analysis to establish a karyotype using G-banding and R-banding. Other banding methods may be performed if desired.
      2. **Learn karyotyping**
         1. Use cytovision to create Karyotype. Practice at least 10 cells
      3. **Suggested Reading List Provided by Directors**

REFERENCES

* 1. Wegner, Rolf-Dieter. Diagnostic Cytogenetics, Springer-Verlag, 1999. ISBN 3540646027.
  2. Barch, M.J., Knutsen, T., and Spurbeck, J.L., Eds. The AGT Cytogenetics Laboratory Manual, 3rd Edition, Lippincott-Raven, 1997. ISBN 0397516517.
  3. Block, A.W. Cancer cytogenetics, pp. 345-420, in “The Principles of Clinical Cytogenetics.” Gerson, S.L., and Keagle, M.B., eds. Humana Press, Totowa, NJ, 1999.
  4. Randolph, L.M. Prenatal cytogenetics, pp. 259-316, in “The Principles of Clinical Cytogenetics.” Gerson, S.L., and Keagle, M.B., eds. Humana Press, Totowa, NJ, 1999.
  5. Pflueger, S.M.V. Cytogenetics of spontaneous abortions, pp. 317-344, in “The Principles of Clinical Cytogenetics.” Gerson, S.L., and Keagle, M.B., eds. Humana Press, Totowa, NJ, 1999.
  6. Howard-Peebles, P.N. Fragile X: From cytogenetics to molecular genetics, pp. 425-442, in “The Principles of Clinical Cytogenetics.” Gerson, S.L., and Keagle, M.B., eds. Humana Press, Totowa, NJ, 1999.
  7. Wang, W.C.C. Genomic imprinting and uniparental disomy, pp. 473-498, in “The Principles of Clinical Cytogenetics.” Gerson, S.L., and Keagle, M.B., eds. Humana Press, Totowa, NJ, 1999.
  8. Thompson, M.W., McInnes, R.R., and Willard, H.F. eds. Clinical cytogenetics: General principles and autosomal abnormalities, pp. 201-228, in “Genetics in Medicine,” 5th Edition, W.B. Saunders, Philadelphia, PA, 1991.
  9. Thompson, M.W., McInnes, R.R., and Willard, H.F., eds. The sex chromosomes and their abnormalities, pp. 231-246, in “Genetics in Medicine,” 5th Edition, W.B. Saunders, Philadelphia, PA, 1991.
  10. Heim, S., and Mitelman, F., editors. Cancer Cytogenetics, 2nd Edition, Wiley-Liss, New York, NY, 1995.
  11. Thompson, M.W., McInnes, R.R., and Willard, H.F. editors. “Genetics in Medicine,” 5th Edition, W.B. Saunders, Philadelphia, PA, 1991.
  12. Gerson, S.L., and Keagle, M.B. editors. “The Principles of Clinical Cytogenetics,” Humana Press, Totowa, NJ, 1999.
  13. Bernard and Berger. Location and function of critical genes in leukemogenesis inferred from cytogenetic abnormalities in hematologic malignancies. *Semin. Hematol*. 37:412-419, 2000.
  14. Harrison. The management of patients with leukaemia: the role of cytogenetics in this molecular era. *Br. J. Haematol.* 108:19-30, 2000.
  15. Hokland and Pallisgaard. Integration of molecular methods for detection of balanced translocations in the diagnosis and follow-up of patients with leukemia. *Semin Hematol* 37:358-367, 2000.
  16. Mitelman. Recurrent chromosome aberrations in cancer. *Mutat. Res.* 462:247-253, 2000.
  17. Heim, S., and Mitelman, F., editors. *Cancer Cytogenetics*, 2nd Edition, Wiley-Liss, New York, NY, 1995.
  18. Meltzer, P., and Trent, J. Chromosome rearrangements in human solid tumors, chapter 6. In: *The Genetic Basis of Human Cancer*, ed., Vogelstein B. and Kinzler, K.W., eds. McGraw Hill, 1998.
  19. Brodeur, G.M., and Hogarty, M.D. Gene amplification in human cancers: Biological and clinical significance, Chapter 6. In: *The Genetic Basis of Human Cancer*, ed.,Vogelstein B. and Kinzler, K.W., eds. McGraw Hill, 1998.
  20. Mitelman, F., Johansson, B., Mandahl, N., and Mertens, F. Clinical significance of cytogenetic findings in solid tumors. *Cancer Genet. Cytogenet.* 95:1-8, 1997.
  21. Ladanyi, M. et al. Contribution of molecular genetic data to the classification of sarcomas. *Human Path.* 5:532-538, 2000.
  22. Reik, W., and Walter, J. Genomic imprinting: Parental influence on the genome. *Nat. Rev. Genet*. 2:21-32, 2001.
  23. Robinson, A., and de la Chapelle, A. Sex chromosome abnormalities. In: Emery and Rimon’s *Principles and Practice of Medical Genetics*, 3rd ed., pp. 973-997, 1997.
  24. Andreeff, M., and Pinkel, D., eds. Introduction to Fluorescence In Situ Hybridization: *Principles and Clinical Applications*, Wiley-Liss, New York, 1999.
  25. Trask, B. Fluorescence in situ hybridization. In: *Genome Analysis: A Laboratory Manual*, Vol. 4, Mapping Genomes, Birren, B., et al., eds. Cold spring Harbor Laboratory Press, New York, pp. 303-411, 1999.
  26. Speicher, M.R. Karyotyping human chromosomes by combinatorial multi-fluor FISH. *Nat. Genet.* 12:368-375, 1996.
  27. Weiss, M.M. Comparative genomic hybridization. *J. Clin. Pathol: Mol. Pathol.* 52:243-245, 1999.
  28. Gardner, R.J.M., and Sutherland, G.R. Chromosome Abnormalities and Genetic Counseling, Third Ed., *Oxford Monog. Med. Genet*. 46, Oxford University Press, 2004.
  29. ISCN (2005): *An International System for Human Cytogenetic Nomenclature*: Recommendations of the International Standing Committee on Human Cytogenetic Nomenclature, eds., Shaffer, L.G., Tommerup, N., S. Karger, Basel, Switzerland, 2005.

Other references as recommended by the Directors.

Written By: Director Approval:

(Signature and Date) (Signature and Date)

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Cytogenetics Supervisor