|  |
| --- |
| Epigenetics and disease… |
| Non-specific |  | [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11] |
| Mental and behavioural disorders | Psychiatric disorders | [12] |
| Schizophrenia | [13, 14, 15] |
| Post-traumatic stress disorder | [16] |
| ADHD | [17] |
| Endocrine, nutritional and metabolic diseases | Obesity | [18, 19, 20, 21, 22] |
| Diabetes | [21] |
| Metabolic disorders (lipid traits) | [23] |
| Metabolic syndrome | [24] |
| Endocrine disorders | [25] |
| Diseases of the digestive system | Inflammatory bowel disease | [26] |
| Crohn’s disease | [27] |
| Diseases of the respiratory system | Asthma | [28, 29, 30, 31] |
| Diseases of the circulatory system | Pulmonary disease | [32] |
| Diseases of the nervous system | Parkinson’s disease | [33] |
| Diseases of the eye and adnexa | Eye diseases (general) | [34] |
| Neoplasms | Testis cancer (and fertility) | [35] |
| Leukaemia | [36] |
| Injury, poisoning and certain other consequences of external cause | Altitude illness | [37] |
| Other (non-ICD category) | Nuclear envelope disease | [38] |
| Allergic diseases | [39, 40] |
| Epigenetics and environmental stimuli… |
| Multiple factors | [2, 4, 5, 6, 7, 8, 11, 28, 30, 31, 35, 41] |
| Diet | [5, 20] |
| Particular matter | [42] |
| Toxin (arsenic, benzene, nickel) | [36, 41] |
| …during pre-, postnatal, or early development |
| Non-specific | [6, 14, 17, 28, 43] |
| Developmental origin of diseases | [7, 21] |
| Heritability of epigenetic health risk… |
|  | [44] |
| Models, theories, and paradigms in epigenetics… |
| Current ‘state of the art’ of epigenetics | [2, 8, 18, 45, 46] |
| Animal models (mouse) | [9, 47] |
| Model of genetic organisms and human disease | [48] |
| Stochastic epigenetic variation | [49] |
| Phenotypic variability | [50, 51] |
| Social policy | [52] |
| Dental variations | [53] |
| Neo-Lamarckian medicine | [54] |
| Epigenetic modulators and therapeutics | [24] |
| Study designs for epigenetic research | [55, 56, 57, 58] |

**References**

1. Handel AE, Ebers GC, Ramagopalan SV: Epigenetics: molecular mechansism and implications for disease. Trends Mol Med 2010;16(1):7-16.
2. Jirtle RL, Skinner MK: Environmental epigenomics and disease susceptibility. Nat Rev Genet 2007;8(4):253-62.
3. Bjornsson HT, Fallin MD, Feinberg AP: An integrated epigenetic and genetic approach to common human disease. Trends Genet 2004;20(8):350-358.
4. Wallace DC: Bioenergetics and the epigenome: interface between the environment and genes in common diseases. Dev Disabil Res Rev 2010;16(2):114-119.
5. Tang W, Ho SM: Epigenetic reprogramming and imprinting in origins of disease. Rev Endocr and Metab Disord 2007;8(2):173-182.
6. Lobanenkov V, Loukinov D, Pugacheva E: Conference scene: environmental epigenomics and disease susceptibility. Epigenomics 2011;3(3):261-266.
7. Godfrey KM, Lillycrop KA, Burdge GC, Gluckman PD, Hanson MA: Epigenetic mechanisms and the mismatch concept of the developmental origins of health and disease. Pediatr Res 2007;61(5 Pt 2):5R-10R.
8. Hamilton JP: Epigenetics: principles and practice. Dig Dis 2011;29(2):130-135.
9. Conerly M, Grady WM: Insights into the role of DNA methylation in disease through the use of mouse models. Dis Model Mech 2010;3(5-6):290-297.
10. Petronis A. Epigenetics as a unifying principle in the aetiology of complex traits and diseases. Nature 2010;465(7299):721-727.
11. Hirst M, Marra MA. Epigenetics and human disease. Int J Biochem Cell Biol 2009;41(1):136-146.
12. Bondy B: Genetics in psychiatry: are the promises met? World J Biol Psychiatry 2011:12(2):81-88.
13. Maric NP, Svrakic DM: Why schizophrenia genetics needs epigenetics: a review. Psychiatr Danub 2012;24(1):2-18.
14. Perrin M, Kleinhaus K, Messinger J, Malaspina D: Critical periods and the developmental origins of disease: an epigenetic perspective of schizophrenia. Annals New York Acad Sci 2010:1204:E8-E13.
15. Krebs MO, Bellon A, Mainguy G, Jay TM, Frieling H: One-carbon metabolism and schizophrenia: current challenges and future directions. Trends Mol Med 2009;15(12):562-570.
16. Yehuda R, Flory JD, Pratchett LC, Buxbaum J, Ising M, Holsboer F: Putative biological mechanisms for the association between early life adversity and the subsequent development of PTSD. Psychopharmacology 2010;212(3):405-417.
17. Mill J, Petronis A: Pre- and peri-natal environmental risk for attention-deficit hyperactivity disorder (ADHD): the potential role of epigenetic processes in mediating susceptibility. J Child Psychol Psychiatry 2008;49(10):1020-1030.
18. Manco M, Dallapiccola B: Genetics of pediatric obesity. Pediatrics 2012;130(1):123-133.
19. Hinney A, Vogel CIG, Hebebran J: From monogenic to polygenic obesity: recent advances. Eur Child Adolesc Psychiatry 2010;19(3):297-310.
20. Campión J, Milagro FI, Martínez JA: Individuality and epigenetics in obesity. Obes Rev 2009;10(4):383-392.
21. Stöger R: The thrifty epigenotype: an acquired and heritable predisposition for obesity and diabetes? Bioessays 2008;30(2):156-166.
22. Walley AJ, Blakemore AIF, Froguel P: Genetics of obesity and the prediction of risk for health. Hu Mol Genet 2006;15(2):R124-R130.
23. Ordovás JM, Robertson R, Cléirigh EN: Gene-gene and gene-environment interactions defining lipid-related traits. Curr Opin Lipidol 2011;22(2):129-136.
24. Kirk H, Cefalu WT, Ribnicky D, Liu Z, Eilertsen KJ: Botanicals as epigenetic modulators for mechanisms contributing to development of metabolic syndrome. Metabolism 2008;57(Suppl. 1):S16-S23.
25. Zhang X, Ho SM: Epigenetics meets endocrinology. J Mol Endocrinol 2011;46(1):R11-R32.
26. Scharl M, Rogler G: Inflammatory bowel disease pathogenesis: what is new? Curr Opin Gastroenterol 2012;28(4):301-309.
27. Fransen KM, Mitrovic M, van Diemen CC, Weersma RK: The quest for genetic risk factors for Chron’s disease in the post-GWAS era. Genome Med 2011;3(2):13-23.
28. Chang JC, Wang L, Chen RF, Liu CA: Perinatal gene-gene and gene-environment interactions on IgE production and asthma development. Clin Deve Immunol 2012;2012:1-9.
29. Koppelman GH, Nawijn MC: Recent advances in the epigenetics and genomics of asthma. Curr Opin Allergy Clin immunol 2011;11(5):414-419.
30. Ober C, Vercelli D: Gene-environment interactions in human disease: nuisance or opportunity? Trends Genet 2011;27(3):107-115.
31. Miller RL, Ho SM: Environmental epigenetics and asthma: current concepts and call for studies. Am J Respir Crit Care Med 2008;177(6):567-573.
32. Yang IV, Schwartz DA: Epigenetic control of gene expression in the lung. Am J Respir Crit Care Med 2011;183(10):1295-1301.
33. Tansey MG, McCoy MK, Frank-Cannon TC: Neuroinflammatory mechanisms in Parkinson’s disease: potential environmental triggers, pathways, and targets for early therapeutic intervention. Exp Neurol 2007;208(1):1-25.
34. Cvekl A, Mitton KP: Epigenetic regulatory mechanisms in vertebrate eye development and disease. Heredity 2010;105(1):135-151.
35. Godmann M, Lambrot R, Kimmins S: The dynamic epigenetic program in male germ cells: its role in spermatogenesis, testis cancer, and its response to the environment. Microsc Res Tech 2009;72(8):603-619.
36. Morgan GJ, Alvares CL: Benzene and the hemopoietic stem cell. Chem Biol Interact 2005;153-154:217-222.
37. MacInnis MJ, Koehle MS, Rupert JL: Evidence for a genetic basis for altitude illness: 2010 update. High Alt Med Biol 2010;11(4):349-368.
38. Schirmer EC: The epigenetics of nuclear envelope organization and disease. Mutat Res 2008;647(1-2):112-121.
39. Prescott S, Allen KJ: Food allergy: riding the second wave of the allergy epidemic. Pediatr Allergy Immunol 2011;22(2):155-160.
40. Prescott S, Saffery R: The role of epigenetic dysregulation in the epidemic of allergic disease. Clin Epigenetics 2011;2(2):223-232.
41. Sutherland JE, Costa M: Epigenetics and the environment. Annals New York Acad Sci 2003;983(1):151-160.
42. Ji H, Hershey GKK: Genetic and epigenetic influence on the response to environmental particulate matter. J Allergy Clin Immunol 2012;129(1):33-41.
43. Hanson M, Godfrey KM, Lillycrop KA, Burdge GC, Gluckman PD: Developmental plasticity and development origins of non-communicable disease: theoretical considerations and epigenetic mechanisms. Prog Biophys Mol Biol 2011;106(1):272-280.
44. Wells JCK, Stock JT: Re-examining heritability: genetics, life history and plasticity. Trends Endocrinol Metab 2011;22(10):421-428.
45. Bernstein BE, Meissner A, Lander ES: The mammalian epigenome. Cell 2007;128(4):669-681.
46. Meaburn EL, Schalwyk LC, Mill J: Allele-specific methylation in the human genome: implications for genetic studies of complex disease. Epigenetics 2010;5(7):578-582.
47. Rosenfeld CS: Animal models to study environmental epigenetics. Biology of Reprod 2010;82(3):473-488.
48. Spradling A, Ganetsky B, Hieter P, Johnston M, Olson M, Orr-Weaver T, et al.: New roles for model genetic organisms in understanding and treating human diseases: report from the 2006 genetics society of America meeting. Genetics 2006;172(4):2025-2032.
49. Feinberg AP, Irizarry RA: Stochastic epigenetic variation as a driving force of development, evolutionary adaption, and disease. Proc Natl Acad Sci U S A 2010;107(Suppl. 1):1757-1764.
50. Turan N, Katari S, Coutifaris C, Sapienza C: Explaining inter-individual variability in phenotype: is epigenetics up to the challenge? Epigenetics 2010;5(1):16-19.
51. Whitelaw E, Martin DIK: Retrotransposons as epigenetic mediators of phenotypic variation in mammals. Nat Genet 2001;27(4):361-365.
52. Lundborg P, Stenberg A: Nature, nurture and socioeconomic policy – what can we learn from genetics? Econ Hum Biol 2010;8(3):320-330.
53. Townsend G, Hughes T, Luciano M, Bockmann M, Brook A: Genetic and environmental influences on human dental variation: a critical evaluation of studies involving twins. Arch Oral Biol 2009;54(Suppl. 1):S45-S51.
54. Gorelick R: Neo-Lamarckian medicine. Med Hypotheses 2004;62(2):299-303.
55. Bell JT, Spector TD: A twin approach to unravelling epigenetics. Trends Genet 2011;27(3):116-125.
56. Banerjee A: A review of family history of cardiovascular disease: risk factor and research tool. Intl J Clin Prac 2012;66(6):536-543.
57. Thomas D: Gene-environment-wide association studies: emerging approaches. Nat Rev Genet 2010;11(4):259-272.
58. Petronis A: Epigenetics and twins: three variations on the theme. Trends Genet 2006;22(7):347-350.