

## References

- [1] Reeves, R. H., Baxter, L. L. and Richtsmeier, J. T. (2001). Too much of a good thing: Mechanisms of gene action in Down syndrome. *Trends Genet.* 17:83–88.
- [2] Epstein, C. J. (1995) in *The Metabolic and Molecular Bases of Inherited Disease*, eds. Scriver, C. R., Beaudet, A. L., Sly, W. S. and Valle, D. (McGraw–Hill, New York), pp. 749–794.
- [3] Fuentes, J. J., Pritchard, M. A., Plana, A. M., Bosch, A., Ferrer, I., and Estivill, X. (1995). A new human gene from the Down syndrome critical region encodes a proline-rich protein highly expressed in fetal brain and heart. *Hum. Mol. Genet.* 4:1935–1944.
- [4] Fuentes, J. J., Genesca, L., Kingsbury, T. J., Cunningham, K. W., Perez Riba, M., Estivill, X., and de la Luna, S. (2000) *DSCR1*, overexpressed in Down syndrome, is an inhibitor of calcineurin-mediated signaling pathways. *Hum. Mol. Genet.* 9:1681–1690.
- [5] Kingsbury, T. J. and Cunningham, K. W. (2000). A conserved family of calcineurin regulators. *Genes Dev.* 14:1595–1604.
- [6] Görlach, J., Fox, D. S., Cutler, N. S., Cox, G. M., Perfect, J. R., and Heitman, J. (2000). Identification and characterization of a highly conserved calcineurin binding protein, CBP1/calciressin, in *Cryptococcus neoformans*. *EMBO J.* 19:3618–3629.
- [7] Klee, C. B., Ren, H. and Wang, X. (1998). Regulation of the Calmodulin stimulated Protein Phosphatase, Calcineurin. *J. Biol. Chem.* 273:13367–13370.
- [8] Mansuy, I. M., Mayford, M., Jacob, B., Kandel, E. R., and Bach, M. E. (1998). Restricted and regulated overexpression reveals calcineurin as a key component of the transition from short-term to long-term memory. *Cell* 92:39–49.

- [9] Rothermel, B., Vega, R. B., Yang, J., Wu, H., Bassel-Duby, R., and Williams, R. S. (2000). A protein encoded within the Down syndrome critical region is enriched in striated muscles and inhibits calcineurin signaling. *J. Biol. Chem.* 275:8719–8725.
- [10] Malleret, G., Haditsch, U., Genoux, D., Jones, M. W., Bliss, T. V. P., Vanhose, A. M., Weitlaug, C., Kandel, E. R., Winder, D. G., and Mansuy, I. M. (2001). Reversible enhancement of learning, memory and long-term potentiation by genetic inhibition of the protein phosphatase calcineurin. *Cell* 104:675–686.
- [11] Zeng, H., Chattarji, S., Barbarosie, M., Rondi-Reig, L., Philpot, B. D., Miyakawa, T., Bear, M. F. and Tonegawa, S. (2001). Forebrain-specific calcineurin knockout selectively impairs bidirectional synaptic plasticity and working memory. *Cell* 107:617–629.
- [12] Ian R. Gilmore, Stephen P. Fox, Andrew J. Hollins, Muhammad Sohail and Saghir Akhtar (2004). *Journal of Drug Targeting* 12 (6):315–340.
- [13] Tijsterman, M., Ketting, R.F. and Plasterk, R.H. (2002). The genetics of RNA silencing. *Annu. Rev. Genet.* 36:489–519.
- [14] Medema, R.H. (2004). Optimizing RNA interference for application in mammalian cells. *Biochem. J.* :in press.
- [15] Fire, A., Xu, S., Montgomery, M.K., Kostas, S.A., Driver, S.E. and Mello, C.C. (1998). Potent and specific genetic interference by doublestranded RNA in *Caenorhabditis elegans*. *Nature* 391:806–811.
- [16] Kennerdell, J.R. and Carthew, R.W. (1998). Use of dsRNA-mediated genetic interference to demonstrate that frizzled and frizzled 2 act in the wingless pathway. *Cell* 95:1017–1026.
- [17] Oelgeschlager, M., Larrain, J., Geissert, D. and De Robertis, E.M. (2000). The evolutionarily conserved BMP-binding protein Twisted gastrulation promotes BMP signaling. *Nature* 405:757–763.

- [18] Lewis, D.L., Hagstrom, J.E., Loomis, A.G., Wolff, J.A. and Herweijer, H. (2002). Efficient delivery of siRNA for inhibition of gene expression in postnatal mice. *Nat. Genet.* 32:107–108.
- [19] Elbashir, S.M., Harborth, J., Lendeckel, W., Yalcin, A., Weber, K. and Tuschl, T. (2001a). Duplexes of 21-nucleotide RNAs mediate RNA interference in cultured mammalian cells. *Nature* 411:494–498.
- [20] Elbashir, S.M., Martinez, J., Patkaniowska, A., Lendeckel, W. and Tuschl, T. (2001b) Functional anatomy of siRNAs for mediating efficient RNAi in *Drosophila melanogaster* embryo lysate. *EMBO J.* 20:6877–6888.
- [21] McManus, M.T. and Sharp, P.A. (2002). Gene silencing in mammals by small interfering RNAs. *Nat. Rev. Genet.* 3:737–747.
- [22] Dykxhoorn, D.M., Novina, C.D. and Sharp, P.A. (2003). Killing the messenger: short RNAs that silence gene expression. *Nat. Rev. Mol. Cell Biol.* 4:457–467.
- [23] Lieberman, J., Song, E., Lee, S.K. and Shankar, P. (2003). Interfering with disease: opportunities and roadblocks to harnessing RNA interference. *Trends Mol. Med.* 9:397–403.
- [24] Sioud, M. (2004). Therapeutic siRNAs. *Trends Pharmacol. Sci.* 25:22–28.
- [25] Schifflers, R.M., Woodle, M.C. and Scaria, P. (2004). Pharmaceutical prospects for RNA interference. *Pharm. Res.* 21:1–7.
- [26] Akhtar, S., Hughes, M.D., Khan, A., Double, J., Hussain, M., Nawaz, Q., Bibby, M. and Sayyed, P. (2000) The delivery of antisense therapeutics. *Adv. Drug Deliv. Rev.* 44: 3–21.
- [27] Hughes, M.D., Hussain, M., Nawaz, Q., Petch, A.K., Sayyed, P. and Akhtar, S. (2001). Cellular delivery of antisense oligonucleotides and ribozymes. *Drug Discov.* 16:303–315.
- [28] Hall, J. (2004). Unravelling the general properties of siRNAs strength in numbers and lessons from the past. *Nat. Rev. Genet.* 5: 552–557.
- [29] Down, J.L.H. (1866). Observations on an ethnic classification of idiots. *Clinical Lecture Reports, London Hospital* 3: 259-262.

- [30] Down, J.L.H. (1999). The Man and the Message. *Down Syndrome Research and Practice* 6 (1): 19-24.
- [31] Warkany, J. (1971). *Congenital Malformations: Notes and Comments, Year Book Medical Publications, Chicago: 124-125.*
- [32] Jérôme Lejeune (1959). Down syndrome. Jérôme Lejeune foundation [online] 2006. Available from: <http://www.fondationlejeune.org>[2006, December 21].
- [33] Gordon, A.; Benda, C.E.; Böök, J.A.; Carter, C.O.; Ford, C.E.; Çhu, E.H.Y.; Hanhart, E.; Jervis, G.; Down, L.; J. Lejeune, H. Nishimura, J. Oster, L.S. Penrose, P.E. Polani, Edith L. Potter, Curt Stern, R. Turpin, J. Warkany, and Herman Y. (1961). "Mongolism (Correspondence)". *The Lancet* 1 (7180): 775.
- [34] Howard J., N. (1979). On the diagnostic term "Down's disease. *Medical History* 23 (1): 102-104.
- [35] Leshin, L. (2003). What's in a name [online]. Available from: <http://www.ds-health.com/name.htm>[2006, December 21]
- [36] Mikkelsen M., Poulsen H., Nielsen K.G. (2006). Incidence, survival, and mortality in Down syndrome in Denmark. *American Journal of Medical Genetics* 37 (S2): 75-78.
- [37] Wisniewski, K. E.; Wisniewski, H. M.; Wen, G. Y (1985). Occurrence of neuropathological changes and dementia of Alzheimer's disease in Down's syndrome. *Ann. Neurol.* 17: 278-282.
- [38] Thuline, H. C.; Poeschel, S. M (1982). Cytogenetics in Down syndrome. In: Poeschel, S. M.; Rynders, J. E. : *Down Syndrome. Advances in Biomedicine and the Behavioral Sciences.* Cambridge: Ware Press (pub.) 1982. Pp. 133 only.
- [39] Hook, E. G., Poeschel, S. M.; Rynders, J. E (1982). *Down Syndrome. Advances in Biomedicine and the Behavioral Sciences.* Cambridge: Ware Press (pub.) 1982. P. 11 only.

- [40] Mikkelsen, M (1977). Down's syndrome cytogenetic epidemiology. *Hereditas* 86: 45-59, 1977.
- [41] Antonarakis, S. E (1993). Human chromosome 21: genome mapping and exploration circa 1993. *Trends Genet.* 9: 142-148.
- [42] Petersen, M. B., Adelsberger, P. A., Schinzel, A. A.; Binkert, F., Hinkel, G. K., Antonarakis, S. E (1991). Down syndrome due to de novo Robertsonian translocation t14;21: DNA polymorphism analysis suggests that the origin of the extra 21q is maternal. *Am. J. Hum. Genet.* 49: 529-536.
- [43] Shaffer, L. G.; Jackson-Cook, C. K.; Stasiowski, B. A.; Spence, J. E.; Brown, J. A (1992). Parental origin determination in 30 de novo Robertsonian translocations. *Am. J. Med. Genet.* 43: 957-963.
- [44] Grasso, M.; Giovannucci, M. L.; Pierluigi, M.; Tavellini, F.; Perroni, L.; Dagna-Bicarelli, F (1989). Isochromosome, not translocation in trisomy 21q21q. *Hum. Genet.* 84: 63-65.
- [44] Antonarakis, S. E.; Adelsberger, P. A.; Petersen, M. B.; Binkert, F.; Schinzel, A. A (1990). Analysis of DNA polymorphism suggests that most de novo dup(21q) chromosomes in patients with Down syndrome are isochromosomes and not translocations. *Am. J. Hum. Genet.* 47: 968-972.
- [45] Rahmani, Z.; Blouin, J.; Creau-Goldberg, N.; Watkins, P.; Mattei, J.; Poissonnier, M.; Prieur, M.; Chettouh, Z.; Nicole, A.; Aurias, A.; Sinet, P.; Delabar, J(1989). Critical role of D21S55 region on chromosome 21 in the pathogenesis of Down syndrome. *Proc. Nat. Acad. Sci.* 86: 5958-5962.
- [46] McCormick, M.; Schinzel, A.; Petersen, M.; Stetten, G.; Driscoll, D.; Cantu, E.; Tranebjaerg, L.; Mikkelsen, M.; Watkins, P.; Antonarakis, S (1989). Molecular genetic approach to the characterization of the Down syndrome region of chromosome 21. *Genomics* 5: 325-331.

- [47] Korenberg, J.; Kawashima, H.; Pulst, S.; Ikeuchi, T.; Ogasawara, N.; Yamamoto, K.; Schonberg, S.; Kojis, T.; Allen, L.; Magenis, E.; Ikawa, H.; Taniguchi, N.; Epstein, C (1990). Molecular definition of the region of chromosome 21 that causes features of the Down syndrome phenotype. *Am. J. Hum. Genet.* 47: 236-246.
- [48] Delabar, J. M.; Theophile, D.; Rahmani, Z.; Chettouh, Z.; Blouin, J. L.; Prieur, M.; Noel, B.; Sinet, P. M (1993). Molecular mapping of twenty-four features of Down syndrome on chromosome 21. *Europ. J. Hum. Genet.* 1: 114-124.
- [49] Korenberg, J. R (1993). Toward a molecular understanding of Down syndrome. In: Epstein, C. J. : *The Phenotypic Man. Prog. Clin. Biol. Res.* 384. Pp. 87-115.
- [50] Ohira, M.; Ichikawa, H.; Suzuki, E.; Iwaki, M.; Suzuki, K.; Saito-Ohara F.; Ikeuchi, T.; Chumakov, I.; Tanahashi, H.; Tashiro, K.; Sakaki, Y (1996). A 1.6-Mb P1-based physical map of the Down syndrome region on chromosome 21. *Genomics* 33: 65-74.
- [51] Nakamura, A.; Hattori, M.; Sakaki, Y (1997). A novel gene isolated from human placenta located in Down syndrome critical region on chromosome 21. *DNA Res.* 4: 321-324.
- [52] Vidal-Taboada, J. M.; Sanz, S.; Egeo, A.; Scartezzini, P.; Oliva, R (1998). Identification and characterization of a new gene from human chromosome 21 between markers D21S343 and D21S268 encoding a leucine-rich protein. *Biochem. Biophys. Res. Commun.* 250: 547-554.
- [53] Vidal-Taboada, J. M.; Lu, A.; Pique, M.; Pons, G.; Gil, J.; Oliva, R (2000). Down syndrome critical region gene 2: expression during mouse development and in human cell lines indicates a function related to cell proliferation. *Biochem. Biophys. Res. Commun.* 272: 156-163.

- [54] Nakamura, A.; Hattori, M.; Sakaki, Y (1997). Isolation of a novel human gene from the Down syndrome critical region of chromosome 21q22.2. *J. Biochem.* 122: 872-877.
- [55] Karen T. Chang, Yi-Jun Shi, and Kyung-Tai Min (2003). The *Drosophila* homolog of Down's syndrome critical region 1 gene regulates learning: Implications for mental retardation). *Proc Natl Acad Sci U S A.* 100(26): 15794–15799.
- [56] Mansuy I. M., Jacob M. M., B., Kandel E. R., and Bach M. E., (1998). Restricted and Regulated Overexpression Reveals Calcineurin as a Key Component in the Transition from Short-Term to Long-Term Memory. *Cell*, Vol. 92: 39–49.
- [57] Casas, C., Martı́nez, S., Pritchard, M. A., Fuentes, J. J., Nadal, M., Guimera, J., Arbone's, M., Flo'rez, J., Soriano, E., Estivill, X., *et al.* (2000) *Mech. Dev.* 101: 289–292.
- [58] Hassold, T., and Jacobs, P. (1984). Trisomy in man. *Annu. Rev. Genet.* 18: 69–97.
- [59] Carrión, A.M., Link, W.A., Ledo, F., Mellstrom, B. and Naranjo, J.R. (1999) DREAM is a  $Ca^{2+}$ -regulated transcriptional repressor. *Nature*, 398: 80–84.
- [60] Chawla, S., Hardingham, G.E., Quinn, D.R. and Bading, H. (1998) CBP: a signal-regulated transcriptional coactivator controlled by nuclear calcium and CaM kinase IV. *Science*, 281: 1505–1509.
- [61] Crabtree, G.R. (1999) Generic signals and specific outcomes: signaling through  $Ca^{2+}$ , calcineurin, and NF-AT. *Cell*, 96: 611–614.
- [62] Molkenstin, J.D., Lu, J.R., Antos, C.L., Markham, B., Richardson, J., Robbins, J., Grant, S.R. and Olson, E.N. (1998) A calcineurin-dependent pathway for cardiac hypertrophy. *Cell*, 93: 215–228.
- [63] Musaro, A., McCullagh, K.J., Naya, F.J., Olson, E.N. and Rosenthal, N. (1999) IGF-1 induces skeletal myocyte hypertrophy through calcineurin in association with GATA-2 and NF-ATc1. *Nature*, 400: 581–585.

- [64] Semsarian, C., Wu, M.J., Ju, Y.K., Marciniak, T., Yeoh, T., Allen, D.G., Harvey, R.P. and Graham, R.M. (1999) Skeletal muscle hypertrophy is mediated by a  $\text{Ca}^{2+}$ -dependent calcineurin signalling pathway. *Nature*, 400: 576–581.
- [65] Chin, E.R., Olson, E.N., Richardson, J.A., Yang, Q., Humphries, C., Shelton, J.M., Wu, H., Zhu, W., Bassel-Duby, R. and Williams, R.S. (1998) A calcineurin-dependent transcriptional pathway controls skeletal muscle fiber type. *Genes Dev.* 12: 2499–2509.
- [66] de la Pompa, J.L., Timmerman, L.A., Takimoto, H., Yoshida, H., Elia, A.J., Samper, E., Potter, J., Wakeham, A., Marengere, L., Langille, B.L. et al. (1998) Role of the NF-ATc transcription factor in morphogenesis of cardiac valves and septum. *Nature*, 392: 182–186.
- [67] Ranger, A.M., Grusby, M.J., Hodge, M.R., Gravalles, E.M., De la Brousse, F.C., Hoey, T., Mickanin, C., Baldwin, H.S. and Glimcher, L.H. (1998) The transcription factor NF-ATc is essential for cardiac valve formation. *Nature*, 392: 186–189.
- [68] Ho, I.C., Kim, J.H., Rooney, J.W., Spiegelman, B.M. and Glimcher, L.H. (1998) A potential role for the nuclear factor of activated T cells family of transcriptional regulatory proteins in adipogenesis. *Proc. Natl Acad. Sci. USA*, 95: 15537–15541.
- [69] Klee, C.B., Ren, H. and Wang, X. (1998) Regulation of the calmodulin-stimulated protein phosphatase calcineurin. *J. Biol. Chem*, 273: 13367–13370.
- [70] Kissinger, C.R., Parge, H.E., Knighton, D.R., Lewis, C.T., Pelletier, L.A., Tempczyk, A., Kalish, V.J., Tucker, K.D., Showalter, R.E., Moomaw, E.W. et al. (1995) Crystal structures of human calcineurin and the human FKBP12-FK506-calcineurin complex. *Nature*, 378: 641–644.



- [71] Griffith, J.P., Kim, J.L., Kim, E.E., Sintchak, M.D., Thomson, J.A., Fitzgibbon, M.J., Fleming, M.A., Caron, P.R., Hsiao, K. and Navia, M.A. (1995) X-ray structure of calcineurin inhibited by the immunophilin-immunosuppressant FKBP12-FK506 complex. *Cell*, 82: 507–522.
- [72] Beale, G., Hollins, A.J., Benboubetra, M., Sohail, M., Fox, S.P., Benter, I., and Akhtar, S. (2003) "Gene silencing nucleic acids designed by scanning arrays: anti-EGFR activity of siRNA, ribozyme and DNA enzymes targeting a single hybridization-accessible region using the same delivery system", *J. Drug Target*. 11: 449–456.
- [73] Hammond, S.M., Bernstein, E., Beach, D. and Hannon, G.J. (2000) "An RNA-directed nuclease mediates post-transcriptional gene silencing in *Drosophila* cells", *Nature* 404: 293–296.
- [74] Zamore, P.D., Tuschl, T., Sharp, P.A. and Bartel, D.P. (2000) "RNAi: double-stranded RNA directs the ATP-dependent cleavage of mRNA at 21 to 23 nucleotide intervals", *Cell* 101: 25–33.
- [75] Martinez, J. and Tuschl, T. (2004) "RISC is a 5' phosphomonoester producing RNA endonuclease", *Genes Dev.* 18: 975–980.
- [76] Kennedy, S., Wang, D. and Ruvkun, G. (2004) "A conserved siRNAdegrading RNase negatively regulates RNA interference in *C. elegans*", *Nature* 427: 645–649.
- [77] Schwarz, D.S., Tomari, Y. and Zamore, P.D. (2004) "The RNA-induced silencing complex is a Mg<sup>2+</sup>-dependent endonuclease", *Curr. Biol.* 14: 787–791.
- [78] Hammond, S.M., Boettcher, S., Caudy, A.A., Kobayashi, R. and Hannon, G.J. (2001) "Argonaute2, a link between genetic and biochemical analyses of RNAi", *Science* 293: 1146–1150.

- [79] Caudy, A.A., Myers, M., Hannon, G.J. and Hammond, S.M. (2002) "Fragile X-related protein and VIG associate with the RNA interference machinery", *Genes Dev.* 16: 2491–2496.
- [80] Caudy, A.A., Ketting, R.F., Hammond, S.M., Denli, A.M., Bathoorn, A.M., Tops, B.B., Silva, J.M., Myers, M.M., Hannon, G.J. and Plasterk, R.H. (2003) "A micrococcal nuclease homologue in RNAi effector complexes", *Nature* 425: 411–414.
- [81] Martinez, J., Patkaniowska, A., Urlaub, H., Luhrmann, R. and Tuschl, T. (2002) "Single-stranded antisense siRNAs guide target RNA cleavage in RNAi", *Cell* 110: 563–574.
- [82] Nykanen, A., Haley, B. and Zamore, P.D. (2001) "ATP requirements and small interfering RNA structure in the RNA interference pathway", *Cell* 107: 309–321.
- [83] Ishizuka, A., Siomi, M.C. and Siomi, H. (2002) "A *Drosophila* fragile X protein interacts with components of RNAi and ribosomal proteins", *Genes Dev.* 16: 2497–2508.
- [84] Leu, Y.W., Rahmatpanah, F., Shi, H., Wei, S.H., Liu, J.C., Yan, P.S. and Huang, T.H. (2003) "Double RNA interference of DNMT3b and DNMT1 enhances DNA demethylation and gene reactivation", *Cancer Res.* 63: 6110–6115.
- [85] Silva, J.M. et al. (2005) *Nat. Genet.* 37: 1281–1288.
- [86] Dickins, R.A. et al. (2005) *Nat. Genet.* 37: 1289–1295.
- [87] Gou, D., Jin, N. and Liu, L. (2003) Gene silencing in mammalian cells by PCR-based short hairpin RNA. *FEBS Lett.* 548: 113–8.
- [88] Castonotto, D., Haitang, L.I. and Rossi, J. (2002) Functional siRNA expression from transfected PCR products. *RNA* 8: 1454–60.

- [89] Livak KJ, Schmittgen TD. (2001) Analysis of relative gene expression data using real-time quantitative PCR and the  $2^{-\Delta\Delta Ct}$  method. **Methods**, 25: 402-408.
- [90] Pfaffl MW. (2001) A new mathematical model for relative quantification in real-time RT-PCR. **Nucl Acid res**, 29: 2002-2007.
- [91] Lyle R., Gehrig C., Henrichsen C.N., Deutsch S., and Stylianou E. A. (2004). Gene Expression From the Aneuploid Chromosome in a Trisomy Mouse Model of Down Syndrome. **Genome Research** 14:1268-1274
- [92] Snøve Jr 1-3 O. & Rossi J. J. (2006). Expressing short hairpin RNAs *in vivo*. **Nature Methods**, 3:689-695.
- [93] Earmak G., Davies K.J.A. (2003). DSCR1 (Adapt78)—A Janus Gene Providing Stress Protection but Causing Alzheimer's Disease? **IUBMB Life**, 55: 29-31

APPENDIX A  
BUFFERS AND REAGENT

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## 1. Buffer P1

100mM glucose	50	ml
100mM Tris-HCl (pH 8.0)	25	ml
100mM EDTA (pH 8.0)	10	ml
Distilled water to	100	ml

Sterilize the solution by autoclaving and store at 4°C.

## 2. Buffer P2

10N NaOH	2	ml
10% (w/v) SDS	10	ml
Distilled water to	100	ml

Sterilize the solution by autoclaving and store at room temperature.

## 3. Buffer P3

5 M potassium acetate	60	ml
Glacial acetic acid	11.5	ml
Distilled water to	100	ml

The resulting solution is 3M with respect to potassium and 5M with respect to acetate. Store the solution at 4°C and transfer it to an ice bucket just before use.

## 4. 10% SDS solution

Sodium dodecyl sulfate	10	g
Distilled water to	100	ml

Mix the solution and store at room temperature.

## 5. 1.5 M Tris-HCl

Tris base	12.11	g
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Dissolve in distilled water and adjusted pH to 7.5 with HCl

Distilled water to	100	ml
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## 6. 0.5 M EDTA (pH 8.0)

Disodium ethylenediamine tetraacetate.2H<sub>2</sub>O 186.6 g

Dissolve in distilled water and adjusted pH to 8.0 with NaOH

Distilled water to 1,000 ml

Sterilize the solution by autoclaving and store at room temperature.

7. 1.0 M MgCl<sub>2</sub>

Magnesium chloride.6 H<sub>2</sub>O 20.33 g

Distilled water to 100 ml

Dispense the solution into aliquots and sterilize by autoclaving.

## 8. 5 M NaCl

Sodium chloride 29.25 g

Distilled water to 100 ml

Dispense the solution into aliquots and sterilize by autoclaving.

## 9. 10X Tris borate buffer (10X TBE)

Tris base	100	g
Boric acid	55	g
0.5 M EDTA (pH 8.0)	40	ml

Adjust volume to 1,000 ml with distilled water. The solution was mixed and stored at room temperature.

## 10. 7.5M Ammonium acetate

Ammonium acetate	57.81	g
Distilled water	80	ml

Adjust volume to 100 ml with distilled water and sterilize by autoclaving.



## 11. 6X loading dye

Bromphenol blue	0.25	g
Xylene Cyanol	0.25	g
Glycerol	50	ml
1M Tris (pH 8.0)	40	ml
Distilled water to	100	ml

Mix and stored at 4°C

## 11. 1% agarose gel (w/v)

Agarose	1.0	g
1x TBE	100	ml

Dissolve by heating and occasional mix until no granules of agarose gel are visible.

## 12. 16% polyacrylamide gel (w/v)

1.5M Tris-HCl pH 8.8	1.25	ml
10% SDS	50	$\mu$ l
40% Acrylamide/Bis	2	ml
10% APS	25	$\mu$ l
TEMED	2.5	$\mu$ l
Distilled water	1.75	ml

## 13. 8% polyacrylamide gel (w/v)

1.5M Tris-HCl pH 8.8	1.25	ml
10% SDS	50	$\mu$ l
40% Acrylamide/Bis	1	ml
10% APS	25	$\mu$ l
TEMED	2.5	$\mu$ l
Distilled water	2.75	ml

## 14. 6% polyacrylamide gel (w/v)

0.5M Tris-HCl pH 6.8	500	μl
10% SDS	100	μl
40% Acrylamide/Bis	750	μl
10% APS	50	μl
TEMED	25	μl
Distilled water	3.7	ml

## 13. Lysed buffer (for cytoplasm lysis)

5% Tween20	10	ml
50mM PIPES pH8.0 piperazine-N,N'-bis(2-ethanesulfonic acid)	10	ml
1M KCl	8.5	ml
Distilled water	71.5	ml

Mix and store at room temperature.

When using, add 100X Proteinase inhibitor to final concentration at 1X and keep on ice.

## 14. Lysis buffer (for nuclear lysis)

10% SDS	10	ml
1M Tris-HCl pH8.1	5	ml
100mM EDTA	10	ml
Distilled water	75	ml

Mix and store at room temperature.

When using, add 100X Proteinase inhibitor to final concentration at 1 and keep on ice.

## 15. Ethidium Bromide

Ethidium Bromide	10	mg
Distilled water	1	ml

Mix the solution and store at 4°C

## BIBLIOGRAPHY

Ms. Natchamon Sakundejpaiboon was born in Bangkok in May 3<sup>rd</sup>, 1981. In 2003, she received her bachelor degree in Biotechnology from Faculty of Science, Thammasat University. Consequently, she started to study in curriculum of Genetics in the Faculty of Science for her master degree. In 2007, she received her master degree in Genetics from Faculty of Science, Chulalongkorn University.