

double-stranded DNAs, discontinuous double-stranded DNAs, open circular, supercoiled, and hairpin molecules (21,22). After electrophoresis and before blotting, a depurination step is included to introduce breaks into molecules, which would otherwise renature by snapback on neutralization. The duration/acid concentration of the treatment is fairly critical and will depend upon gel thickness. A balance has to be attained between undertreatment, resulting in underrepresentation of snapback forms on the final autoradiogram, and over-treatment, causing a general reduction in hybridization signal of all forms.

## References

1. Howell, S. H. (1985) The molecular biology of plant DNA viruses. *CRC Crit. Rev. Plant Sci.* **2**, 287–316.
2. Covey, S. N. and Hull, R. (1992) Genetic engineering with double-stranded DNA viruses, in *Genetic Engineering with Plant Viruses* (Davies, J. W. and Wilson, T. M. A., eds.), CRC, Boca Raton, p. 217.
3. Franck, A., Guilley, H., Jonard, G., Richards, K., and Hirth, L. (1980) Nucleotide sequence of cauliflower mosaic virus DNA. *Cell* **21**, 285–294.
4. Gardner, R. C., Howarth, A. J., Hahn, P., Brownluedi, M., Shepherd, R. J., and Messing, J. (1981) The complete nucleotide sequence of an infectious clone of cauliflower mosaic virus by M13mp7 shotgun sequencing. *Nucleic Acids Res.* **9**, 2871–2888.
5. Howarth, A. J., Gardner, R. C., Messing, J., and Shepherd, R. J. (1981) Nucleotide sequence of naturally occurring deletion mutants of cauliflower mosaic virus is transmitted naturally by aphids. *Virology* **112**, 678–685.
6. Balazs, E., Guilley, H., Jonard, G., and Richards, K. (1982) Nucleotide sequence of DNA from an altered-virulence isolate D/H of cauliflower mosaic virus. *Gene* **19**, 239–249.
7. Fang, R., Wu, X., Bu, M., Tian, Y., Cai, F., and Mang, K. (1985) Complete nucleotide sequence of cauliflower mosaic virus (Xinjiang isolate) genomic DNA. *Chin. J. Virol.* **1**, 247–256.
8. Chenault, K. D., Steffens, D. L., and Melcher, U. K. (1992) Nucleotide sequence of cauliflower mosaic virus isolate NY8153. *Plant Physiol.* **100**, 542–545.
9. Chenault, K. D. and Melcher, U. (1993) Cauliflower mosaic virus isolate CMV-1. *Plant Physiol.* **101**, 1395–1396.
10. Chenault, K. D. and Melcher, U. K. (1993) The complete nucleotide sequence of cauliflower mosaic virus isolate BBC. *Gene* **123**, 255–257.
11. Hull, R., Sadler, J., and Longstaff, M. (1986) The sequence of carnation etched ring virus DNA: comparison with cauliflower mosaic virus and retroviruses. *EMBO J.* **5**, 3083–3090.
12. Richins, R. D., Scholthof, H. B., and Shepherd, R. J. (1987) Sequence of figwort mosaic virus DNA (caulimovirus group). *Nucleic Acids Res.* **15**, 8451–8466.
13. Hasegawa, A., Verver, J., Shimada, A., Saito, M., Goldbach, R., van Kammen, A., Milki, K., Kameyaiwaki, M., and Hibi, T. (1989) The complete sequence of soybean chlorotic mottle virus DNA and the identification of a novel promoter. *Nucleic Acids Res.* **17**, 9993–10,015.