Benchmarks

dynamics of active and stable edges in motile fibroblasts investigated by using atomic force microscopy. *Proc. Natl. Acad. Sci. USA* 96:921-926.

6. **Spierenburg, G.T., F.T. Oerlemans, J.P. van Laarhoven and C.H. de Bryun.** 1984. Phototoxicity of N-2-hydroxyethylpiperazine-N'-2-ethanesulfonic acid-buffered culture media for human leukemic cell lines. *Cancer Res.* 44:2253-2254.

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Polyacrylamide Gel Fixation by Drying and Gluing to Both Paper and Transparent Plastic

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Even in the age of computer scanners and imagers, perfect gel fixation still remains a problem. The described method was designed to obtain permanent records of the polyacrylamide gels for visual inspection. The advantages of the present protocol (see Table 1) are: (i) the avoidance of expenses, because it requires neither special apparatus nor expensive reagents; and (ii) the protection of the dried gel with the transparent plastic. The resulting image, in our opinion, is much more durable than those prepared by any other methods (1-3), and, in our experience, it is not subject to occasional damage. We use the following materials: (i) 3 MM paper (Whatman, Clifton, NJ, USA) or an

Table 1. Protocol

1. Proceed with the electrophoresis, staining and destaining of the gel to be dried. The protocol of staining and destaining seems not to be critical for the present method of drying. We use the most conventional one:
Staining the gel for 2 h with 0.1% Coomassie® Blue R-250 in fixative (40% methanol, 10% acetic acid).
Destaining the gel with several changes of the same fixative to remove background (usually for 6-12 h).
2. Trim the plastic sheet and Whatman paper to be within 1-2 cm larger than the gel on each side.
3. Place the gel to the middle of the damp Whatman paper. Remove the bubbles, and place all this sandwich to the stack of paper towels 2-3-cm high. Let it dry for 15-20 min. The water solution on the upper surface of the gel should evaporate. Do not let the corners of the gel curve.
4. Smear the gel with the glue (0.05-0.1 mL/cm²). Be sure that the entire surface, especially the edges, is well covered.
5. Put the plastic sheet onto the glue layer. Try to avoid the formation of big bubbles under the plastic surface. Bubbles 1-2 mm in diameter are not critical.
6. Place a 5-10-kg weight with a flat bottom to cover the entire surface of the gel. Allow drying of the gel to proceed for 12-24 h. If possible, replace the towels periodically.
7. When drying is completed (the glue layer becomes absolutely transparent), trim the plastic and the Whatman paper around the gel perimeter. Adhere the resulting picture to the working diary with the adhesive tape or with the same glue.

analogous, (ii) transparent plastic—the source is not critical. We routinely use the Verbatum™ laser printer transparencies (Verbatim, Charlotte, NC, USA) and (iii) polyvinylacetate glue ("white glue"; Akron, Novgorod, Russia) or the Elmer's® Glue-All (Borden, Columbus, OH, USA).

The process described in Table 1 is similar to Southern transfer. The destaining solution migrates out of the gel to the paper towels, being gradually replaced by the glue. The pre-polymer component of the glue migrates no further than Whatman paper, thus adhering the dried gel to both paper and plastic. Even the subsequent cracking of the dried gel does not influence the quality of the resulting image. After drying, the visual detection of some protein bands is enhanced because the background is white and the protein bands become darker. The gels do not shrink after this drying, except for a slight deformation on the edges. Owing to the usage of the glue, any kind of transparent plastic, which can ensure the desirable durability of the resulting image, can be used in this system.

REFERENCES

1. **Michaels, S.D. and J.C. Ford.** 1991. Inexpensive method for air-drying polyacrylamide electrophoresis gels. *BioTechniques* 11:466-467.
2. **Porter D.R. and M.J. Gatsceff.** 1992. Simplified drying of polyacrylamide gels for fluorography. *BioTechniques* 13:364-365.
3. **Smith, B.J.** 1994. Drying gels. *Methods Mol. Biol.* 32:157-161.

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