

## GUIDELINES FOR USE

**PRODUCT:** Corning® Matrigel® Basement Membrane Matrix Growth Factor Reduced Phenol Red Free, 10 ml vial

**CATALOG NUMBER:** 356231

**BACKGROUND:**

Basement membranes are thin extracellular matrices underlying cells *in vivo*. Corning Matrigel Matrix Growth Factor Reduced (GFR) Phenol Red Free is a solubilized basement membrane preparation extracted from the Engelbreth-Holm-Swarm (EHS) mouse sarcoma, a tumor rich in extracellular matrix proteins. Its major component is laminin, followed by collagen IV, heparan sulfate proteoglycans, entactin/nidogen.<sup>1,2</sup> Corning Matrigel Matrix GFR Phenol Red Free also contains TGF-beta, epidermal growth factor, insulin-like growth factor, fibroblast growth factor, tissue plasminogen activator,<sup>3,4</sup> and other growth factors which occur naturally in the EHS tumor. Corning Matrigel Matrix GFR Phenol Red Free is effective for the attachment and differentiation of both normal and transformed anchorage dependent epithelioid and other cell types. These include neurons,<sup>5,6</sup> hepatocytes,<sup>7</sup> Sertoli cells,<sup>8,9</sup> chick lens,<sup>10</sup> and vascular endothelial cells.<sup>11</sup> Corning Matrigel Matrix GFR Phenol Red Free will influence gene expression in adult rat hepatocytes,<sup>12,13</sup> vascular endothelial cells,<sup>14</sup> as well as three dimensional culture in mouse<sup>15-18</sup> and human<sup>19,20</sup> mammary epithelial cells. It is the basis for several types of tumor cell invasion assays,<sup>21,22</sup> will support *in vivo* peripheral nerve regeneration,<sup>23-25</sup> and provides the substrate necessary for the study of angiogenesis both *in vitro*<sup>26,27</sup> and *in vivo*.<sup>25, 28-30</sup> Corning Matrigel Matrix GFR Phenol Red Free also supports *in vivo* propagation of human tumors in immunosuppressed mice.<sup>31-33</sup> Corning Matrigel Matrix GFR Phenol Red Free can be used for the transplantation of unsorted mammary cells,<sup>34</sup> as well as sorted epithelial subpopulations embedded in Corning Matrigel.<sup>35,36</sup> This matrix has also been used as a cancer stem cell model and shown to enhance tumor growth rates *in vivo*.<sup>37</sup>

Corning Matrigel Matrix GFR Phenol Red Free was developed for those who require a reconstituted basement membrane preparation purified and characterized to a greater extent than Corning Matrigel Matrix. The method<sup>38</sup> used to prepare this product effectively reduced the level of a variety of growth factors except for TGF-beta which may be bound to collagen IV<sup>39</sup> and/or sequestered in a latent form that partitions with the major components in the purification procedure. The major components: laminin, collagen IV and entactin (nidogen) are conserved by the process while the level of heparan sulfate proteoglycan is reduced by 40-50%. The following table shows the values for growth factors in Corning Matrigel Matrix compared to a typical lot of Corning Matrigel Matrix GFR Phenol Red Free.

Parameter	Corning Matrigel Matrix	Corning Matrigel Matrix GFR Phenol Red Free
bFGF (pg/mL) <sup>4</sup>	0 - 0.1	0 - 0.1
EGF (ng/mL)	0.5 - 1.3	< 0.5
IGF-1 (ng/mL)	15.6	5
PDGF (pg/mL)	12	< 5
NGF (ng/mL)	< 0.2	< 0.2
TGF-beta (ng/mL)	2.3	1.7
% Protein that gels	80	83

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**SOURCE:** Engelbreth-Holm-Swarm (EHS) Mouse Tumor

**FORMULATION:** Dulbecco's Modified Eagle's Medium with 50 µg/mL gentamycin.  
Corning® Matrigel® Matrix GFR Phenol Red Free is compatible with all culture media.

**STORAGE:** Stable when stored at -20°C. Freeze thaws should be minimized by aliquotting into one time use aliquots. Store aliquots in the -20°C freezer until ready for use. **DO NOT STORE IN FROST-FREE FREEZER. KEEP FROZEN.**

**EXPIRATION DATE:** The expiration date for Corning Matrigel Matrix GFR Phenol Red Free is lot specific and can be found on the product Certificate of Analysis.

**CAUTION:** It is extremely important that Corning Matrigel Matrix GFR Phenol Red Free and all cultureware or media coming in contact with Corning Matrigel Matrix GFR Phenol Red Free should be pre-chilled/ice-cold since Corning Matrigel Matrix GFR Phenol Red Free will start to gel above 10°C. Keep Corning Matrigel Matrix on ice at all times.

**RECONSTITUTION AND USE:**

Thaw Corning Matrigel Matrix GFR Phenol Red Free by submerging the vial in ice in a 4°C refrigerator, in the back, overnight. Once Corning Matrigel Matrix GFR Phenol Red Free is thawed, swirl vial to ensure that material is evenly dispersed. Keep Corning Matrigel Matrix on ice at all times. Handle with sterile technique. Place thawed vial of Corning Matrigel Matrix GFR Phenol Red Free in sterile area, spray top of vial with 70% ethanol and air dry.

Corning Matrigel Matrix GFR Phenol Red Free may be gently pipetted using a pre-cooled pipet to ensure homogeneity. Aliquot Corning Matrigel Matrix GFR Phenol Red Free to tubes, switching tips whenever Corning Matrigel Matrix GFR Phenol Red Free is clogging the tip and/or causing the pipet to measure inaccurately. Gelled Corning Matrigel Matrix GFR Phenol Red Free may be re-liquified if placed at 4°C in ice for 24-48 hours.

Corning Matrigel Matrix GFR Phenol Red Free may be used as a thin gel layer (0.5 mm), with cells plated on top. Cells may also be cultured inside the Corning Matrigel Matrix GFR Phenol Red Free, using a 1 mm layer. Extensive dilution will result in a thin, non-gelled protein layer. This may be useful for cell attachment, but may not be as effective in differentiation studies.

**COATING PROCEDURES:**

Corning Matrigel Matrix GFR Phenol Red Free may be used in several ways. The Thin Gel Method is useful for plating cells on top of the gel, the Thick Gel Method allows you to grow cells within a three dimensional matrix, and the Thin Coating Method (no gel) provides you with a complex protein layer on top of which to grow your cells. Make your selection based on the final result that you wish to achieve, whether it is cell growth, attachment or differentiation.

**NOTE:** Application specific protocols are posted on the support web page.\* The protein concentration for Corning Matrigel Matrix products is lot specific and provided on the Certificate of Analysis. For consistent results dilute Corning Matrigel Matrix products by calculating the specific protein concentration (mg/mL) required. To maintain a gelled consistency we recommend not diluting Corning Matrigel Matrix to less than 3 mg/mL. Use ice-cold serum-free medium to dilute Corning Matrigel Matrix. Mix by pipetting up and down or by swirling the vial in ice.

## Thin Gel Method

1. Thaw Corning® Matrigel® Matrix GFR Phenol Red Free as recommended. Using cooled pipets, mix the Corning Matrigel Matrix GFR Phenol Red Free to homogeneity.
2. Keeping culture plates on ice, add 50 µl/cm<sup>2</sup> of growth surface.
3. Place plates at 37°C for 30 minutes.
4. If necessary aspirate unbound material just before use and rinse gently using serum-free medium. Ensure that the tip of the pipet does not scratch the coated surface. Plates are now ready to use.

## Thick Gel Method

1. Thaw Corning Matrigel Matrix GFR Phenol Red Free as recommended. Using cooled pipets, mix the Corning Matrigel Matrix GFR Phenol Red Free to homogeneity.
2. Keep culture plates on ice. Add cells to Corning Matrigel Matrix GFR Phenol Red Free and suspend using cooled pipets. Add 150-200 µl/cm<sup>2</sup> of growth surface.
3. Place plates at 37°C for 30 minutes. Culture medium may now be added. Cells may also be cultured on top of this gel.

## Thin Coating Method

1. Thaw Corning Matrigel Matrix GFR Phenol Red Free as recommended. Using cooled pipets, mix the Corning Matrigel Matrix GFR Phenol Red Free to homogeneity.
2. Dilute Corning Matrigel Matrix GFR Phenol Red Free to desired concentration using serum-free medium. Empirical studies should be completed to determine the optimal coating concentration for your application.
3. Add diluted Corning Matrigel Matrix GFR Phenol Red Free to vessel being coated. Quantity should be sufficient to cover entire growth surface easily. Incubate at room temperature for one hour.
4. Aspirate unbound material and rinse gently using serum-free medium. Plates are now ready to use.

## CELL RECOVERY:

Corning Dispase (Cat. No. 354235), Corning Cell Recovery Solution (Cat. No. 354253).

Most efficient recovery of cells growing on Corning Matrigel Matrix GFR Phenol Red Free is accomplished using Corning Cell Recovery Solution that depolymerizes the Corning Matrigel Matrix GFR Phenol Red Free within 7 hours on ice or with Corning Dispase, a metalloenzyme which gently releases the cells allowing for continuous culture.

**\*NOTE:** For technical resources contact Technical Support at:  
tel: 800.492.1110; email: [CLSTechServ@corning.com](mailto:CLSTechServ@corning.com)

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## CALIFORNIA PROPOSITION 65 NOTICE

WARNING:	This product contains a chemical known to the state of California to cause cancer.
Component:	<b>Chloroform</b>

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