DOWNLOAD PDF BASEMENT MEMBRANES

Chapter 1 : Basement Membrane | Definition of Basement Membrane by Merriam-Webster

The basement membrane is a thin, fibrous, extracellular matrix of tissue that separates the lining of an internal or external body surface from underlying connective tissue in metazoans.

Newcomer Supply Basement Membrane, Gomori Stain Kit procedure, with included microwave modification, is a straightforward silver technique similar to the Jones Method for identification of glomerular and tubular basement membranes in renal tissue. Paraffin sections cut at microns Solutions: All solutions are manufactured by Newcomer Supply, Inc. All Newcomer Supply Stain Kits are designed to be used with Coplin jars filled to 40 ml following the staining procedure provided below. Some solutions in the kit may contain extra volumes. See Procedure Notes 1 and 2. Prepare Silver-Methenamine Working Solution; combine and mix well: See Procedure Notes 3 and 4. Do not preheat solution if using Microwave Modification. Deparaffinize sections thoroughly in three changes of xylene, 3 minutes each. Wash well with distilled water. See Procedure Notes 5 and 6. Place in Solution D: Wash in gently running tap water for 5 minutes; rinse in distilled water. Periodically remove the control, rinse in warm distilled water, check microscopically for adequate silver impregnation. Basement membranes should be dark brown. If the tissue structures are not sufficiently dark, place slides back in heated silver solution. Recheck at minute intervals until desired intensity is achieved. Staining at room temperature will require longer incubation times. See Procedure Note 7. Check microscopically for adequate development. If additional incubation is required, return slides to heated Silver-Methenamine Working Solution. Rinse in three changes of distilled water. Tone sections in Solution E: Rinse well in three changes of distilled water. Place in Solution F: Counterstain in Solution G: Quickly rinse slides in two changes of distilled water. Clear in three changes of xylene, 10 dips each; coverslip with compatible mounting medium.

Chapter 2 : Jones' Method for Basement Membranes

The basement membrane lies between the epidermis, or outer layer of skin, and the dermis, the middle layer of skin, keeping them tightly connected. But basement membranes aren't just found in the.

Acc, larval arrest; Egl, egg-laying defective; Emb, embryonic lethal; Lon, long; Neuro, nervous system defects; Pat, paralyzed at two-fold; Ste, sterile. A Body wall muscle m and epidermis e have thin sheets of BM. The epidermal BM has a lollipop-like appearance arrowhead. The outward-facing body wall muscle BM white arrow is thicker than the inward-facing BM black arrow. B The BM surrounding the pharynx is very thick arrows. C The distal tip cell dtc extends processes to cover part of the germ cells g. The gonad and intestine i are covered by separate BMs. Reprinted from Huang et al. For all BM molecules that have been appropriately studied, multiple interactions with other BM molecules have been identified Figure 2. The in vivo validity of many of these interactions remains to be established, but the numerous potential interactions between a large number of molecules predicts great diversity in composition and structure of BMs. Major basement membrane molecules are represented in approximately appropriate relative sizes. Arrows represent biochemically defined interactions, mostly derived from studies of vertebrate molecules. The abilities of collagen IV and laminin to polymerize and perlecan to oligomerize are indicated by curved yellow arrows. Collagen IV has a short non-helical amino-terminal domain, a long Gly-X-Y repeat domain with numerous small interruptions and a highly conserved carboxyl-terminal globular NC1 domain. It polymerizes into a disulfide-bonded polygonal network via tetramerization between amino-terminal domains and dimerization between NC1 domains. Most emb-9 and let-2 mutations are missense alterations of Gly residues in the Gly-X-Y repeat domains Figure 3 ; Guo et al. However, alterations of different Gly residues result in phenotypes of differing severities. Gly substitution mutations are generally highly temperature-sensitive, with greater intracellular accumulation and more severe phenotypes occurring at higher temperatures Figure 4 ; Gupta et al. The most severe phenotype is arrest at about the two-fold stage of embryogenesis due to muscle detachment from the body wall resulting from the forces of muscle contraction. Null mutants actually elongate further, to the three-fold stage, indicating that the missense proteins interfere with the function of other molecules Gupta et al. Although type IV collagen had been considered a ubiquitous component of basement membranes, in C. Type IV collagen is found in BMs on the pharynx and intestine, but is not synthesized in these tissues. These studies show that type IV collagen secreted into the pseudocoelomic space can selectively assemble on appropriate tissue surfaces. Mutations in the single C. The a1 and a2 IV collagen chains are represented with amino and carboxyl-terminal domains grayed. The central Gly-X-Y domain is open with black bars representing interruptions of the repeats. Locations of known mutations are indicated and the alternatively spliced region of LET-2 is highlighted. Intracellular accumulation of mutant type IV collagen. EMB-9 also fails to be secreted. In these mutants muscle cells detach from the body wall, resulting in gaps in the body wall muscle quadrants. The vertebrate family of netrins and UNC-6 in C. Structures of the two predicted C. The putative null mutation, epi-1 rh Huang et al. In lam-3 animals the pharyngeal BM is defective and cells extend away from the pharynx, adhering to adjacent muscle or epidermal cells Huang et al. Other tissues are relatively normal, consistent with the particularly strong concentration of LAM-3 on the pharynx. In epi-1 mutants multiple tissues, excluding the pharynx, have BM structural defects and failures of cellular polarization, adhesion, and organization. Several epi-1 alleles were generated in a screen for CAN cell migration defects Forrester and Garriga, ; Forrester et al. These epi-1 mutants also have defects in migration of other cells and the outgrowth of some axons. The mutants display Unc, Egl and Muv phenotypes, but are generally less severe than the mutants described above. These results indicate that cell migration functions of laminin can be disrupted without causing severe disruption of laminin or BM structure. Under body wall muscles it is concentrated beneath the muscle dense bodies and M-lines Francis and Waterston, ; Mullen et al. A large number of UNC isoforms can be generated by alternative splicing. The M form is sufficient for normal muscle function and the significance of the other forms is unclear. Additionally exons of domain IV can be alternatively spliced Figure 7 ; Mullen et al. Strong unc alleles are likely to eliminate or severely reduce unc

function and they cause the Pat phenotype. Body wall muscledense bodies fail to form and sarcomeres are not properly organized, resulting in arrest at the two-fold stage of embryogenesis Hresko et al. Viable, paralyzed unc alleles all affect the alternatively spliced exons of domain IV Rogalski et al. These mutations are expected to only affect a subset of UNC isoforms. They also have somatic gonad defects, possibly due to defects in sheath or uterine myoepithelioid cells. Thirteen intragenic revertants of these viable Unc alleles were all shown to alter the splice acceptors of the exons affected in the original mutant, suggesting that exon skipping can ameliorate the Unc phenotype. Immunolocalization of UNC in adult hermaphrodites. Wild-type hermaphrodites were labeled with GM1. A shows the head from a young adult. The arrow indicates the terminal bulb of the pharynx. Note the punctate pattern over this region. B shows a section of the body-wall muscles from a young adult. The large arrow indicates a dense body, the small arrow indicates an M-line, and the arrowhead indicates the margin of a body-wall muscle cell. C shows the uterine region from an older adult dorsal view. The arrow indicates the base of the uterine muscles, whereas the arrowhead indicates the vulva. Reprinted from Molecular Biology of the Cell Mol. Putative sup null alleles cause maternal-effect lethality but no apparent defect on muscle structure. The identity of SUP is currently unknown. Lethality presumably occurs because splice variants lacking the mutant exon are not produced. MEC-8 is a nuclear protein found in hypodermis, not muscle, and over-expression only in hypodermis can suppress unc phenotypes Spike et al. The synthetic lethality of mec-8 ; unc mutants is only rescued by expression of MEC-8 in hypodermis. These results indicate that UNC is not synthesized by muscle cells, as previously thought Moerman et al. The fact that laser ablation of body wall muscle cells causes gaps in the normally continuous localization of UNC Moerman et al. Structure of the unc gene and protein products. The unc gene consists of 37 exons and spans over 20 kb. Exons boxes , introns lines , and the three classes of protein products are shown. Mutant alleles used in this study are also indicated. The longest ORF encodes a protein of amino acids that is homologous to the mammalian heparan sulfate basement membrane proteoglycan perlecan. Like mammalian perlecan, this polypeptide can be divided into five domains I-V. Additional isoforms are generated through alternative splicing of exons encoding alternative C termini, indicated on the gene as shaded regions. The various protein modules are indicated with shaded boxes or circles. RNAi specific to the major UNC size forms indicate that the M form is important for affecting distal tip cell migration. The unc enhancement of unc-5 distal tip cell migration defects is suppressed by reduction of function mutations in the growth factor genes. Evidence for growth factor binding to perlecan and modulation of signaling has been demonstrated in vertebrates Jiang and Couchman, There are two closely related nidogen genes in mammals, but only a single C. Three alternative splice variants of nid-1 alter the number of EGF repeats in the rod domain Figure 8 ; Kang and Kramer, The ability of nidogen to form a ternary complex with laminin and type IV collagen led to the suggestion that it may function as a linker between BM proteins. The domain structures of the three NID-1 alternative splice isoforms and two mouse nidogen genes are illustrated. Thyroglobulin-like modules in the mouse proteins are indicated by TG. Three nid-1 alleles have been generated: Each of these mutants is viable and fertile, and have no obvious defect in localization of other BM proteins, demonstrating that nidogen is not essential for BM assembly. In the L1 animal staining of multiple basement membranes is seen, but NID-1 is most strongly concentrated around the nerve ring. The ur41 nonsense allele alters the dorso-ventral positioning of several axons Kim and Wadsworth, For example, the dorsal sublateral cords are frequently positioned closer than normal to the dorsal midline and too many axons enter the right vs. The affected axons do reach their normal targets, but these results show that NID-1 influences neural guidance decisions. NID-1 also affects synaptic organization and function Ackley et al. NID-1 is closely associated, but not precisely colocalized, with synaptic markers. However, both pre- and post-synaptic markers show that nid-1 synapses are significantly less well compacted than in wild-type animals, appearing smeared along the nerve cord. These mutants are substantially resistant to a cholinergic agonist, indicating a transmission deficit. They also display uncoordinated behaviors in thrashing assays. All of these defects are more penetrant for the cg null allele than for the cg internal deletion, indicating that NID-1 lacking the G2 domain retains a high degree of normal function. The carboxyl-terminal domain of collagen XVIII, termed endostatin ES , has been characterized as having potent anti-angiogenic activity. This domain is the most highly conserved between the vertebrate and

C. The two longer CLE-1 isoforms are synthesized by neurons, an unusual situation for any collagen. CLE-1 is broadly distributed at low levels throughout BMs, but is notably concentrated on the nervous system.

Chapter 3 : Basement membrane - Wikipedia

Basement membrane. The basement membrane (BM) is a fibrous matrix composed primarily of glycoproteins, type IV collagen, and laminin that are secreted by the epithelial cells (Ryerse,).

The primary criteria for evaluating a basement waterproofing method should be its ability to insulate the basement against all forms of moisture seepage. A waterproofing material should help the basement surface in surviving foundation distress and landscaping challenges, such as infusion of pressurized gases in sunken soil zones. Waterproofing your basement is not demanding, but it requires attention to detail and knowledge about common waterproofing applications. Basement membranes have been regarded as an effective solution for every basement-waterproofing requirement. Basement membranes have a long life cycle and no reactions with moisture. That makes them more effective than external waterproofing coatings which corrode and peel when they are exposed to sustained moisture seepage. It offers years of undemanding waterproofing with negligible need for repair. Emulsion Bituminous Waterproofing Membrane These membranes are the most conventional. Bituminous waterproofing membrane is also known as a petroleum-based waterproofing system. It uses asphalt, which is commonly used in roofing applications. Also called asphaltic waterproofing, membranes are applied in the form of an emulsion. Asphalt is highly resistant to moisture seepage, but its insulation properties can be compromised under severe and continuous water penetration. Emulsion applications often need reinforcing applications such as fiberglass webbing waterproofing. That raises the overall cost of an emulsion-based waterproofing project. The most recent among bituminous waterproofing systems for basements is the use of rubberized asphalt. It is difficult to apply. Emulsion waterproofing membranes are sold in a highly viscous, packaged form. The appearance is that of a dense, sticky liquid that can be easily applied to concrete surfaces to form an insulating layer. They need to systematically applied, using a roller and a trowel. Some emulsion-based waterproofing membranes have been introduced in an easy-to-apply, spray packaging. Most bitumen-based emulsions have one common criticism, which is that they eventually dry and allow moisture to enter the space. Liquid Foundation Waterproofing Membrane The most common waterproofing membranes in residential spaces is liquid waterproofing membrane. Liquid membranes are much easier to apply compared to emulsion membranes. Liquid waterproofing membranes are also the most affordable. They are recommended for waterproofing hard-to-reach places such as undersurfaces, curved spots, and angled nooks. The liquid membrane spreads over a greater surface area, providing more coverage per application. Liquid waterproofing membrane is easy to apply. It is the most effective form of basement waterproofing. Elastomeric Waterproofing Membrane These are the most recent introduction among innovative basement waterproofing membranes. Elastomeric membranes are the most durable os all waterproofing membranes. The membrane is essentially a derivative of urethane or polyurethane. These synthetic membranes are regarded as a one-time application; they last for decades, which is why retailers call them lifetime waterproofing solutions. Elastomeric waterproofing is commonly referred to as polyurethane basement waterproofing. Elastomeric membranes are impermeable to water, chemical vapors, and subterranean gases. They are also more expensive than the basement membranes discussed above. Their application is very simple. The waterproofing material is coated using a paintbrush. No additional reinforcing material is needed; however, elastomeric coating in domestic spaces is recommended only if the basement has already undergone substantial damage due to moisture seepage. Homeowners who have experienced allergic reactions from mold and mildew in the basement should consider elastomeric waterproofing.

Chapter 4 : Basement membrane - Mayo Clinic

basement membrane a sheet of amorphous extracellular material upon which the basal surfaces of epithelial cells rest; it is also associated with muscle cells, Schwann cells, fat cells, and capillaries, interposed between the cellular elements and the underlying connective tissue.

Epithelium is a type of tissue that forms glands and lines the inner and outer surfaces of organs and structures throughout the body. Endothelium is a type of specialized tissue that coats the inner surface of blood vessels. A portion of this membrane, the basal lamina, is secreted by the epithelial cells that overlie it. The reticular layer lies inside the basal lamina and is composed of fibrous tissue. Principally, the basement membrane serves to tie the epithelium to the connective tissue beneath it. In the skin, for example, there are three main layers: Between the epidermis and dermis lies the basement membrane, which keeps the outer layer adhered closely to the lower layer. Ad A second function of the basement membrane is that of a protective barrier against foreign objects or malignant cells. Epithelial tissue often lines parts of the body that are in contact with the outer environment, such as the inside of the stomach where food passes or the skin. The tough, semi-permeable nature of this membrane acts as a filter to prevent unwanted objects from entering the inner reaches of the body. In this way, it can also help contain defective, or malign, cells. In blood vessels, the basement membrane also aids with angiogenesis, or the manufacturing of new blood vessels from existing ones. During this process, the endothelium, which lines the interior of the blood vessel where blood flows, secretes enzymes into the membrane. The enzymes break down the tissue so that the endothelial cells may migrate outward, multiply, and form a new vessel. Before blood can flow in the new vessel, however, a new basement membrane must be formed. The glomerulus is a bundle of capillaries found in the nephron of the kidney , where the fluid portions of blood are emptied out to be cleaned and returned to the blood stream. The glomerular basement membrane lining these capillaries is specially designed to select which parts of the blood are filtered out and which components remain in the blood vessel. Negatively charged and particularly thick, these membranes allow small ions, or negatively charged molecules, and fluid to pass while retaining large molecules and positively charged molecules, such as proteins. Several pathologies may cause weakness or malfunctioning in basement membranes. The causes are not decisively known, but likely include virus, genetics, and chemical exposure. Genetic mutations in the collagen of the basement membranes may cause Alport syndrome, which often leads to kidney failure. Blood in the urine , or hematuria, is the most common symptom of the disorder. Because it is linked to the X chromosome, Alport syndrome is more common in men than in women.

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Chapter 5 : Glomerular basement membrane - Wikipedia

Basement membrane definition is - a thin membranous layer of connective tissue that separates a layer of epithelial cells from the underlying lamina propia. a thin membranous layer of connective tissue that separates a layer of epithelial cells from the underlying lamina propia.

The Newcomer Supply Basement Membrane Control Slides are for the positive histochemical staining of basement membranes in tissue sections. All solutions are manufactured by Newcomer Supply, Inc. See Procedure Notes 1 and 2. Deparaffinize sections thoroughly in three changes of xylene, 3 minutes each. Wash well with distilled water. See Procedure Notes 3 and 4. Place slides in Solution D: Wash in gently running tap water for 5 minutes; rinse in distilled water. Prepare Silver-Methenamine Working Solution and mix well: See Procedure Notes 5 and 6. Periodically remove the control, rinse in warm distilled water, check microscopically for adequate silver impregnation. Basement membranes should be dark brown. If the tissue structures are not sufficiently dark, place slides back in the warm silver solution. Recheck at minute intervals until desired intensity is achieved. Staining at room temperature will require an overall longer incubation time. See Procedure Note 7. Check microscopically for adequate development. If additional incubation is required, return slides to the warm Silver-Methenamine Working Solution. Rinse in three changes of distilled water. Tone sections in Solution E: Rinse well in three changes of distilled water. Place in Solution F: Counterstain in Solution G: Quickly rinse slides in two changes of distilled water. Clear in three changes of xylene, 10 dips each; coverslip with compatible mounting medium.

Chapter 6 : Basement Membranes: Cell and Molecular Biology - Nicholas Kefalides, Jacques Borel - Goog

The basement membrane, or basal lamina, is a sheet of proteins and other substances to which epithelial cells adhere and that forms a barrier between tissues. Once tumours are able to break through this membrane, cancerous cells not only invade surrounding tissue substances.

Chapter 7 : BASEMENT MEMBRANE Control Histology Slides - Newcomer Supply

The basement membrane (membrana basalis) is a thin layer of basal lamina and reticular lamina that anchors and supports the epithelium and endothelium. Epithelium is a type of tissue that forms glands and lines the inner and outer surfaces of organs and structures throughout the body.

Chapter 8 : What is the Basement Membrane? (with picture)

overlies a basement membrane and the adjoining deeper layers of connective tissue (dermis and hypodermis, respectively) -skin has varying degrees of keratinization depending on region of the body epithelium turnover and repair.

Chapter 9 : Basement Membrane, Gomori Stain Kit - Newcomer Supply

Basement membranes are widely distributed extracellular matrices that coat the basal aspect of epithelial and endothelial cells and surround muscle, fat, and Schwann cells. These extracellular matrices, first expressed in early embryogenesis, are self-assembled on competent cell surfaces through.