

家兔回肠淋巴管铸型的扫描电镜研究

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收稿日期:2002-10-09 接受日期:2002-11-04

Lymphatic corrosion casts in rabbit ileum: scanning electronmicroscopic studies

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Received: 2002-10-09 Accepted: 2002-11-04

Abstract

AIM: To investigate the three-dimensional organization and fine distribution of the lymphatics in rabbit ileum.

METHODS: Lymphatic corrosion cast with the Mercor were used for scanning electron microscopy (SEM), and semithin sections were used for light microscopy. The Mercor injected intraparenchymally into ileum wall were cut and put in a concentrated NaOH solution until the tissues were corroded away, and observed under SEM.

RESULTS: The central lacteals were found in the intestinal villi. The villi of the ileum contained two to three lacteals. The central lacteals were drained into the mucosal lymphatic capillary plexus. From the plexus, the lymphatic capillary descended into the lymphatics of submucosal layer and muscular layer. Then they were led into the serosal lymphatics and drained into the lymphatics of intestine mesentery. The cast of the lymphatics showed an appearance of a string of heads and the notch corresponding to the bicuspid valve of the lymphatics.

CONCLUSION: The three-dimensional organization of central lacteals and lymphatics in the rabbit ileum is demonstrated by lymphatic corrosion casts. Numerous impressions of the

endothelial nuclei, rich central lacteals and lymphatic capillary plexus in the ileum mucosa, lymphatic capillary and lymphatics in the submucosa and muscular layer are observed on the lymphatic corrosion cast.

Teng CY, Wang XP, Wei SY, Wang GY, Tang FC. Lymphatic corrosion casts in rabbit ileum: scanning electronmicroscopic studies. *Shijie Huaren Xiaohua Zazhi* 2003;11(4):446-448

摘要

目的: 观察家兔回肠淋巴管的三维结构和微细分布。

方法: 淋巴管铸型样品, 通过扫描电子显微镜进行观察; 半薄切片样品, 用光镜进行观察。淋巴管铸型剂是 Mercor, 采用回肠壁间接注射法。将注入铸型剂的回肠壁切下, 置入 NaOH 水溶液中腐蚀, 直到肠壁组织完全脱离为止, 然后将淋巴管铸型样品置于扫描电子显微镜下观察。

结果: 在小肠绒毛内清晰地显示出中央乳糜管, 每个绒毛中有 2-3 个中央乳糜管。中央乳糜管与黏膜层毛细淋巴管丛相连接。黏膜层毛细淋巴管注入黏膜下层淋巴管, 后者与肌层淋巴管相吻合。肌层淋巴管连接浆膜层淋巴管, 然后汇入小肠系膜淋巴管。淋巴管呈串珠样外观, 其表面存有双凹切迹, 该处相当于淋巴瓣的部位。铸型表面还可以见到淋巴管内皮细胞核的压迹。

结论: 淋巴管铸型清晰地显示家兔回肠壁黏膜层丰富的中央乳糜管和毛细淋巴管丛以及黏膜下层、肌层毛细淋巴管和大量的淋巴管的三维结构。

滕诚毅, 王晓平, 魏双艳, 王广友, 汤凤彩. 家兔回肠淋巴管铸型的扫描电镜研究. *世界华人消化杂志* 2003;11(4):446-448

<http://www.wjgnet.com/1009-3079/11/446.htm>

0 引言

小肠淋巴管的形态研究, 已有不少报道^[1-19], 但对回肠壁各层毛细淋巴管、淋巴管的微细分布和各层淋巴管道的流注关系, 仍有不同观点^[1-8]。应用合成树脂 (Mercor) 制备回肠淋巴管铸型, 研究回肠壁内各层淋巴管道的立体形态和微细分布, 国内尚无报道。我们采用 Mercor 淋巴管间接注射法^[20,21], 进行淋巴管铸型, 在扫描电镜下, 观察了家兔回肠淋巴管道的立体结构。

1 材料和方法

1.1 材料 成年健康家兔 16 只, 雌雄不拘。其中 2 只制备回肠的半薄切片, 两只做回肠的石蜡组织切片, 其

余 12 只制备回肠的淋巴管铸型样品. 铸型剂是 Mercox, 为日本东京生产的一种颗粒微细而均匀的合成树脂 (Velenehospital, Tokyo, Japan).

1.2 方法 在戊巴比妥麻醉下, 打开家兔腹腔. 用 1 ml 或 2 ml 注射器, 连接特制的淋巴管注射针头, 吸入混有硬化剂 MA 的 Mercox 溶液, 在解剖显微镜下, 用手推法将 Mercox 溶液注入回肠黏膜层和黏膜下层^[5,12]. 当观察到蓝色的铸型剂已到达回肠系膜时, 切下该段回肠. 在对系膜缘打开肠腔, 进行流水冲洗, 而后黏膜面向上固定于塑料板上, 浸于生理盐水中, 置 60 温箱内 2 h. 取出样品, 依次浸入 200 g/L NaOH 水溶液和 150 g/L NaOH 水溶液中各 2 h, 当肠壁组织完全被腐蚀后, 样品经流水冲洗, 用眼科器械清除表面渗出物. 样品浸于蒸馏水中冰冻, 并切成 4 × 4 mm 的小块, 经 37 温箱干燥, 固定于扫描电镜样品台上, 进行导电处理后, 于离子喷涂器内喷金, 取加速电压 10-15KV, 于 S-520 扫描电镜下观察和摄片^[12,13]. 家兔回肠材料经透射电镜样品系列处理后, 包埋于 Epn 812 中, 做半薄切片, 次甲基蓝一天青 染色, 在光镜下进行观察.

2 结果

2.1 黏膜层的淋巴管道 在小肠绒毛黏膜上皮的深侧有中央乳糜管. 中央乳糜管起于盲端, 盲端对向回肠的腔面. 其纵轴与回肠的横径平行. 中央乳糜管呈顶端膨大(直径 70-120 μm)的杵状, 基部变细(直径 20-40 μm)后, 直接注入黏膜层毛细淋巴管丛(图 1, 2). 中央乳糜管长度 150-280 μm, 密度 6-9 个/mm². 在一个小肠绒毛内可见到 2-3 个中央乳糜管. 黏膜层的毛细淋巴管特别丰富, 其走行弯曲, 互相连续成丛(图 1), 其直径 15-20 μm. 根据半薄切片光镜的观察, 黏膜层毛细淋巴管丛位于黏膜固有层的深侧, 黏膜肌的浅方(图 3). 从黏膜层毛细淋巴管丛向深方发出许多吻合支, 穿过黏膜肌注入黏膜下层淋巴管丛(图 1).

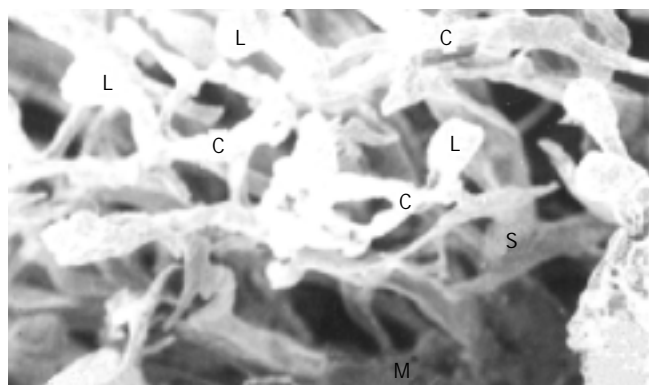


图 1 家兔回肠黏膜层的淋巴管铸型样品. SEM × 70, 标尺 = 50 μm L: 中央乳糜管; C: 毛细淋巴管丛; S: 黏膜下淋巴管; M: 肌层淋巴管.

2.2 黏膜下层、肌层和浆膜层的淋巴管道 家兔回肠黏膜下层有丰富的淋巴管, 并彼此吻合形成黏膜下淋巴

管丛, 从该丛发出侧支进入肌层, 与肌层淋巴管相交通(图 1). 肌层淋巴管注入浆膜层淋巴管, 最后汇入小肠系膜集合淋巴管. 在黏膜下层、肌层和浆膜层也见到带盲端的毛细淋巴管, 但数量较少. 在半薄切片上可以见到淋巴瓣(图 3), 在淋巴管铸型样品上, 也可见到淋巴瓣的双凹压迹及圆形或卵圆形的淋巴管内皮细胞核的压迹(图 4).



图 2 放大的中央乳糜管(L)和黏膜层毛细淋巴管(C), SEM × 250, 标尺 = 50 μm.

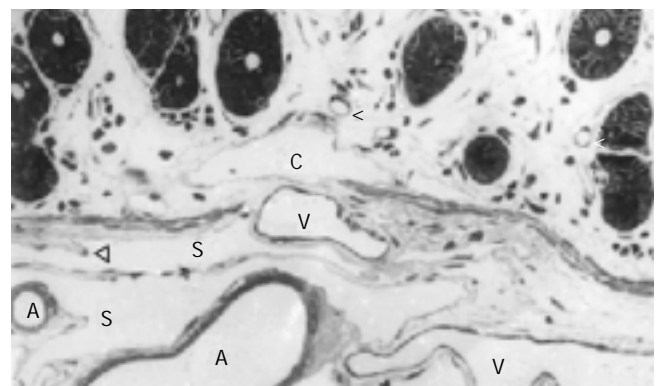


图 3 半薄切片样品. 显示黏膜层毛细淋巴管(C)、毛细血管(<), 黏膜下层淋巴管(S)、淋巴瓣()和静脉(V)、动脉(A) × 200, 标尺 = 20 μm.

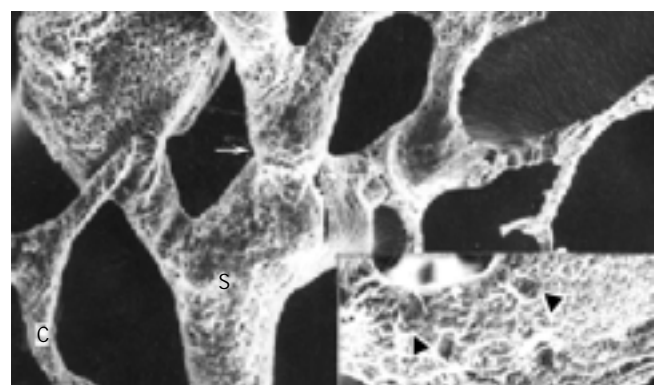


图 4 淋巴管铸型样品. 显示黏膜层毛细淋巴管(C)和较大淋巴管上淋巴瓣的双凹压迹(), 右下角的图显示淋巴管内皮细胞核的压迹() SEM × 400(右下角的图 × 800, 标尺 = 10 μm)标尺 = 50 μm.

3 讨论

以 Mercox 做铸型剂, 采用淋巴管间接注射法, 可以清晰地显示小肠器官内淋巴管的三维结构及微细分布, 这是以往其他研究方法无可比拟的^[1,20,21], 但也

必须注意在注入铸型剂时, 针尖切勿刺入大血管. 在观察和分析结果时也要与血管铸型相鉴别^[6]. 通过淋巴管铸型扫描技术及半薄切片的双重观察, 进一步证实家兔回肠具有丰富的淋巴管道^[20,21]. 本研究在家兔回肠黏膜层观察到大量的中央乳糜管和毛细淋巴管丛, 这与徐玉东 et al^[1]、郑国宝 et al^[2]的结果一致. Fukushima et al^[9]在大鼠小肠内观察到, 小肠绒毛内相邻的几个中央乳糜管的基部相互连接成窦; 本研究在家兔回肠未见到此种情况. 我们观察到家兔回肠内的中央乳糜管没有相互融合, 而是直接注入黏膜层毛细淋巴管网. 在黏膜层未有见到较粗的淋巴管, 这与有些学者^[5]的报道不同, 回肠大量的中央乳糜管、毛细淋巴管和淋巴管与小肠的吸收功能, 肠道免疫相适应^[22-31].

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