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A study of microcircular disorder in acute hemorrhagic necrotic pancreatitis and therapeutic effects of *Danshen* on it in rats

Fan Linjun, Gu Hongguang, Duan Hengchun, Wang Aochuan (Department of Hepatobiliary Surgery, Southwest Hospital, Third Miltary Medical University, Chongqing, 630038)

Abstract After 96 rats were inflicted with acute hemorrhagic necrotic pancreatitis (AHNP) with retrograde injection of 3% sodium taurocholate into the biliopancreatic duct, 48 were treated with Danshen (Radix Salviae Miltiorrhizae) and the other 48 without treatment served as the control. It was found that there were severe hemorrhage, necrosis and microvascular lesions and the activity of pancreatic enzymes in serum was significantly increased ($P < 0.01$) in the 6th hour and the actitivity of the enzymes was decreased but the microvascular and panrenchymal lesions of the pancreas were progressively aggravated in the 12th hour after AHNP in the control. However, the microvascular and parenchymal lesions of the pancreas were significantly alleviated in the 24th h after AHNP in the treated group. Our findings suggest that the microcircular disorder is one of the factors to aggravate the pathological changes in the late stage of AHNP and *Danshen* can exert definite therapeutic effects on AHNP through the improvement of pancreatic microcirculation.

Key words acute pancreatitis; *Danshen*; microcirculation; rat

星形胶质细胞发育的形态学及眼球摘除后 AST反应性改变的实验研究

Experimental studies on the morphology of astrocyte during development and the astrocyte reactivity after enucleation

邓晓林 蔡文琴 (第三军医大学基础部组织与胚胎学教研室) 重庆, 630038

运用胶质纤维酸性蛋白(Glial fibrillary acidic protein, GFAP)免疫细胞化学染色,对43例12~38周人胎儿,63例生后大鼠不同时期(生后1天至12个月)中枢神经系统(Central nervous system, CNS)星形胶质细胞(Astrocyte, AST)发育进行了形态学观察,获得了关于人和大鼠 AST发育、分布、GFAP染色特性等的总体认识;在此基础上采用不同方式的减弱视神经电活动模型,探索有关 AST反应与视神经电活动减弱之间的关系;总结本工作主要有以下几方面成果:

(1) AST形态发育方面:① AST在人胎儿不同时期、CNS不同部位分布存在差异。出现的先后顺序为:由低级中枢到高级中枢、由室管膜和软脑脊膜向脑和脊髓实质,此外 AST的时空差异性还与核团和神经纤维在 CNS的分布位置相关,在某些核团以及颅神经纤维的髓内段,GFAP阳性 AST出现较早。这些现象提示 AST的成熟除了与神经干细胞的位置有关外,还与 AST同神经元(胞体及纤维)的相互诱导作用相关。② 不仅在人胎脑毛细血管周围,而且在某些小血管周围 AST密度较大,染色亦较深。推测平滑肌对 AST成熟可能亦有诱导作用。③ 人胎儿发育过程中,GFAP阳性 AST不具备传统重金属染色所显示的Ⅰ、Ⅱ型 AST的形态特点,而主要存在单突起、多突起、少突起及中间型四种形态。这些不同形态的 GFAP阳性 AST大致的分布规律为:低级中枢以多突起细胞为主,高级中枢以少突起和中间形为主,而单突起细胞多位于室周区;也可见四种形态的 GFAP阳性 AST同时出现于同一脑区,同时出现于同一脑区的4种形态的 AST可能反映了细胞的成熟过程及功能转换,单突起细胞比较"年轻",与引导神经元的迁移有关,而其它形态的细胞逐渐成熟,这些细胞可能与 AST的物质转运及网络形成有关。④ 大鼠 CNS GFAP阳性 AST出现明显晚于人类,出生时在大脑表面仅见阳性带状环,生后3个月其分布和密度接近成年时水平。⑤ 大鼠 GFAP阳性细胞形态相对单一,胞体较小,突起较少而且短,染色均匀,分布较稀疏。⑥ 大鼠生后2天端脑 AST GFAP染色最强,随着发育其染色相反变浅。⑦ 大鼠海马和齿状回的 AST呈均匀、规则的分层排列,预示在神经元与 AST之间存在固定的位置关系与稳定的功能关系。

(2)眼球摘除后 AST反应性改变实验研究方面:① 减弱视神经电活动能有效活化脑多个部位的 AST。② AST的活化与C-fos和 NO表达增强存在伴随关系。③ 活化 AST的因素可能不是单一的,"主动"和"被动"活化的可能性均存在(主动活化:即 AST对神经元电活动依赖性的消失导致的活化;被动活化:却去传入神经元的早期反应性诱导的 AST活化)。④ 脑脊液中活化 AST的成份增加不明显,而外侧膝状体局部活化 AST的成份明显增加。

关键词 星形胶质细胞;胶质纤维酸性蛋白;发育;免疫细胞化学;细胞培养;C-fos;一氧化氮;眼球摘除;外侧膝状体;大脑;颈段脊髓

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