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# The effects of neurotransmitter and non-neurotransmitter amino acids in secondary ischemic spinal cord injury in rabbits

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**Abstract** To induce ischemia of the spinal cord, the abdominal aorta was occluded below the origin of the renal arteries for 20 minutes. The tissue content of excitatory (glutamic and aspartic acid), inhibitory (glycine, GABA, taurine and alanine) and neutral (glutamine, threonine and serine) amino acids was determined in the 4th lumbar segment of the spinal cord before and certain intervals after the reperfusion of the cord. It was found that all the amino acids showed no significant changes during ischemia, glutamate and aspartate were markedly decreased in the 36th and 48th hour after reperfusion, and glycine was decreased in the 2nd and 48th hour, GABA in the 36th hour, and alanine in the 2nd and 24th hour after reperfusion respectively. But taurine was increased in the 24th and 36th hour, glutamine was decreased in the 36th and 48th hour and threonine and serine were not changed at all the time points. The occurrence of the abnormal changes of the amino acids was consistent to the development of the secondary ischemic damages of the spinal cord. The mechanism of the change of each amino acid was discussed.

Key words amino acids; spinal cord injuries; ischemia; reperfusion injury

# 微波炉融化新鲜冰冻血浆对免疫球蛋白等的影响

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微波炉(Microwave Oven,MWO)融化新鲜冰冻血浆(FFP),具有时间短、温度低,能保持良好的凝血因子活性及白蛋白水平的优点,但对FFP中免疫球蛋白(Ig)、补体$C_3$及抗-A、抗-B凝集素的影响尚无报道,我们检测了20例,报告如下:

## 1 材料和方法

### 1.1 材料

20名健康献血者,按单采操作规程,每人取400 ml新鲜血浆,混匀,留取2 ml作为对照组标本。余下分装成2袋,约200 ml/袋,分为甲、乙2组,每组20袋。低温酒精浴预冷后,置-30℃冰箱中,6 h内冰冻成固态,即为FFP。

### 1.2 方法

取出-30℃保存48 h的FFP,甲组37℃水浴法(WB)融化,乙组MWO法融化[1,2]。分别取出对照组、甲组、乙组等量血浆样本检测。

### 1.3 观察项目

IgG、IgA、IgM、补体$C_3$含量(单向免疫扩散法,免疫扩散检测板由重庆医学检验试剂研究所提供);血浆抗-A、抗-B效价测定[3]。

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# Relationship of the number of nucleolar organizer regions and the histologic typing, grading and prognosis of colorectal carcinoma

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**Abstract** Silver-bound nucleolar organizer regions (AgNOR) were counted in 63 cases of colorectal carcinoma. It was found that AgNOR count was significantly different between normal colorectal mucosa and colorectal malignancies ($P<0.01$) and it increased gradually in the well-, moderately- and poorly-differentiated adenocarcinomas. The avarge of AgNOR count was significantly different among the 3 varieties of malignancies ($P<0.01$), but no marked difference could be revealed among well-differentiated adenocarcinoma, mucinous adenocarcinoma and signet-ring cell carcinoma. In the tubular carcinoma, the survival rates of 3, 5 and 10 years decreased and the mortality rate and recurrent rate increased along with the increase of AgNOR count. It is suggested that AgNOR count be a useful indicator in the grading and prognosis of colorectal carcinomas.

**Key words** intestinal neoplasms/PA; intestine, large; nucleolus organizer region; prognosis

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## 2 结果

表 1 显示出不同融化方法对 FFP 中 Ig 及补体 $C_3$ 含量的影响。

表 2 列出了不同融化方法对 FFP 中抗－A，抗－B 的影响及效价评分情况。

**表 1　不同融化方法对 FFP 中 Ig 及补体 $C_3$ 含量的影响(g/L)**

| 组别 | 例数 | IgG | IgA | IgM | $C_3$ |
|---|---|---|---|---|---|
| 对照组 | 20 | 12.56±3.4 | 1.90±0.56 | 1.79±1.11 | 1.10±0.28 |
| 甲　组 | 20 | 12.84±4.3 | 1.64±0.37 | 1.59±1.04 | 1.03±0.26 |
| 乙　组 | 20 | 12.49±3.6 | 1.80±0.47 | 1.80±1.11 | 1.14±0.33 |
| $P$　值 | | >0.05 | >0.05 | >0.05 | >0.05 |

**表 2　不同融化方法对 FFP 中抗－A、抗－B 的影响($n=10$)**

| | 抗－A | | 抗－B | |
|---|---|---|---|---|
| | 效　价 | 评　分 | 效　价 | 评　分 |
| 对照组 | 89.6±31.4 | 25.8±4.7 | 67.2±49.9 | 20.0±13.3 |
| 甲　组 | 89.6±31.4 | 25.8±4.7 | 60.8±38.4 | 20.4±12.1 |
| 乙　组 | 89.6±31.4 | 24.6±1.5 | 64.0±35.1 | 22.8± 9.3 |
| $P$　值 | | >0.05 | | >0.05 |

## 3 讨论

MWO 法融化 FFP 国外已有研究，国内报道甚少，该法较传统的水浴法所需时间短，温度低，给临床抢救病人输注血浆带来极大的方便，同时也减少了细菌污染的机会。我们已经报道了 MWO 融化 FFP 不影响凝血因子活性[2]，本文进一步观察了对 Ig、补体 $C_3$ 等的影响情况。所检测的 20 例正常献血者 FFP，结果显示：对照组、甲组、乙组 Ig、补体 $C_3$ 的含量经变无差异性($P>0.05$)，而且 MWO 法融化的 FFP 中，Ig、补体 $C_3$ 含量较水浴法更接近于对照组。提示 MWO 法融化 FFP 不影响 IgG、IgA、IgM 和补体 $C_3$ 活性。在抗－A、抗－B 效价与对照组的差异观察中，发现各组抗体效价相差不超过一管，效价总体评分相差<10[4]MWO 法融化 FFP 能维持血浆中良好的免疫球蛋白和补体 $C_3$ 水平。

**关键词**　免疫球蛋白类；微波

**中图法分类号**　R457

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