

發芽米萃取物之免疫調節活性與抗氧化性之研究

王秀育、張基郁

E-mail: 345822@mail.dyu.edu.tw

摘要

發芽米(GBR)含有各種人體所需的營養素，具有多種機能性功效，例如：GABA、維生素E、食物纖維、抗氧化物質，以及肌醇、長鏈脂肪酸等多種具有生物活性之物質。本研究以不同溶劑(磷酸緩衝溶液、鹼溶液及乙醇)進行萃取，探討不同溶劑萃取所得之發芽米萃取物之抗氧化活性、對人類白血病細胞U937生長之抑制能力及免疫調節活性。在抗氧化性部分，利用磷酸緩衝溶液萃取所得之發芽米萃取物(PGBR)在DPPH自由基清除能力、還原力及超氧陰離子清除能力方面顯著優於利用鹼溶液(AGBR)和乙醇(EGBR)溶液萃取所得之發芽米萃取物；而在Trolox當量抗氧化能力與亞鐵離子螯合能力方面則是以EGBR之效果為最佳。在細胞與免疫調節活性部分，以PGBR、AGBR及EGBR刺激條件培養液1天，在濃度為800 $\mu\text{g/mL}$ ，各樣品對U937細胞生長抑制率依序為49.83、57.39及51.23%，相同濃度刺激條件培養液3天，其抑制率依序為58.51、62.23及60.77%，以AGBR抑制效果為最高。以PGBR、AGBR及EGBR分別與單核細胞條件培養液共同培養1天及3天，利用細胞激素分泌的測定探討發芽米萃取物之免疫活性，在濃度1000 $\mu\text{g/mL}$ 下，培養1天之條件培養液中所含IL-1 分別為1293.17、1572.93及2094.71 pg/mL 、培養3天分別為1797.56、1861.63及2613.95 pg/mL ，由結果得知，IL-1 之分泌量有隨著培養天數的增加而上升，樣品刺激單核細胞條件培養液分泌IL-1 之效果，以EGBR為最佳。利用不同樣品刺激條件培養液後之TNF- 含量，刺激1天且在濃度為1000 $\mu\text{g/mL}$ 下，其條件培養液中TNF- 含量分別為1950.38、546.30及1365.02 pg/mL ，培養3天後之TNF- 含量分別為2346.54、914.82及1881.10 pg/mL ，結果可知，經由PGBR刺激後之條件培養液所含的TNF- 為最多。利用不同樣品刺激條件培養液後之IFN- 含量，在分別經由PGBR、AGBR及EGBR刺激1天，且在濃度為1000 $\mu\text{g/mL}$ 下，其IFN- 含量分別為853.30、911.75及893.46 pg/mL ，培養3天分別為1461.14、1135.47及907.91 pg/mL ，由結果可知，經由PGBR刺激後之條件培養液所含的IFN- 為最多。以不同發芽米萃取物刺激單核細胞1天及3天後，在樣品濃度為100 $\mu\text{g/mL}$ 下，以PGBR、AGBR及EGBR刺激單核細胞1天後，條件培養液中其NO含量分別為0.54、0.46及0.52 $\mu\text{M/mL}$ ；培養3天後，NO含量依序為0.80、0.68及0.66 $\mu\text{M/mL}$ 。不同發芽米萃取物與單核細胞分別培養1天及3天後，利用MTT法分析單核細胞生長比率，以PGBR、AGBR及EGBR與單核細胞培養1天後，在濃度為100 $\mu\text{g/mL}$ 時，皆發現其具有促進單核細胞生長之效果，其細胞生長率約為1.02~1.04；將發芽米萃取物與單核細胞培養3天後，在濃度為100 $\mu\text{g/mL}$ 時，PGBR及AGBR卻有抑制單核球細胞增生之效果，在500 $\mu\text{g/mL}$ 濃度下，其萃取物更具有毒殺單核細胞生長之影響，其中以PGBR毒殺效果最為顯著。

關鍵詞：發芽米、免疫調節活性、抗氧化、細胞激素、人類白血病細胞U937、人類單核球細胞

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