• 系統編號	RN9705-0530
• 計畫中文名稱	研究 prtn3, pitrm1 和 prtse23 在小鼠囊胚孵化與著床過程中之角色
• 計畫英文名稱	To Study the Role of prtn3, pitrm1, and prtse23 in Mice Blastocyst Hatching and Implantation
• 主管機關	行政院國家科學委員會
• 計畫編號	NSC95-2314-B038-048
• 執行機構	台北醫學大學婦產科
• 本期期間	9508 ~ 9607
• 報告頁數	21 頁
• 使用語言	中文
• 研究人員	曾啓瑞; 陳惠文 Tzeng, Chii-Ruey
• 中文關鍵字	--
• 英文關鍵字	Blastocyst; cDNAmicroarray; Gene expression; Hatching; shRNA
• 中文摘要	查無中文摘要
• 英文摘要	Objective: Hatching is a critical process for implantation during early embryo development. Several gene expressions are highly regulated, cross-talked between embryo and maternal endometrium in embryo hatching and the following implantation process, especially the important role of proteases. In our previous study, we have identified the murine blastocyst hatching-related gens via cDNA microarray technique and T7-based RNA amplification. Among these identical candidate genes, two novel serine proteases, including proteinase 3 (prtn3) and protease, serine, 23 (prss23) have been identified and examined their functions in early embryo development. Design: Prospective basic research study. Materials and Methods: The ICR mice embryos were collected and cultured in human tubal fluid (HTF medium; Santa Ana, CA, USA) containing 0.3% of bovine serum albumin (BSA, Sigma). Specific siRNA (shRNA) for prtn3 and prss23 with microinjection technique was used to knock-down the gene expression in mice embryo. Results: The cDNA microarray data indicated that prtn3 and prss23 have higher expression levels in hatched blastocyst (3.32- and 4.52-folds, comparing with pre-hatching blastocyst). By confirming with real time quantitative RT-PCR, the gene expressions of prtn3 and prss23 showed very different expression dynamic changes during early embryo development from 2-cells to hatched blastocyst. The mRNA level of prtn3 was increased after 2-cells stage and highly expressed in both pre-hatching and hatched blastocyst. However, prss23 only expressed in hatched blastocyst, whereas, almost undetectable from 2-cells to pre-hatching blastocyst. At least three shRNA constructs for prtn3 or prss23 were microinjected into zygotes and then the embryo development were monitored. The results showed that the development of embryos to blastocyst was significantly reduced in prtn3 shRNA injected group as comparing with mock construct

control group. The hatching rates were both decreased in prtn3 (54.3 % reduced) and prss23 (78.6 % reduced) shRNA injected groups after 76 h of observation. Conclusions: This study indicated that the novel serine proteases, prtn3 and prss23 might play important roles in pre-implantation embryo development and blastocyst hatching. Further works in studying the role of these serine proteases in embryo implantation were also underway in vivo. These findings might be very helpful not only in improving our understanding how these serine proteinases works during embryo hatching and implantation process, but also proving the candidate targets for us to control fertility.