Karakterisasi Gen Serpina1f pada Epididimis Mencit (Mus musculus): Studi Pendahuluan tentang Perannya dalam Proses Pematangan Sperma = Characterization of Serpina1f in The Mouse Epididymis: Study Introduction about Its Role in Sperm Maturation Process

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Abstrak

Latar Belakang : Proses pematangan sperma terjadi karena adanya interaksi antara sel sperma dan protein yang disekresikan oleh sel epitel yang melapisi saluran epididimis, sehingga menyebabkan perubahan morfologi dan biokimia pada membran spermatozoa. Sekresi protein pada saluran epididimis ditentukan oleh gen-gen yang diekspresikan secara spesifik di region tertentu misalnya pada region initial segmen, caput, corpus atau cauda sehingga pada masing-masing segmen terbentuk lingkungan spesifik (microenvironment) yang diperlukan untuk proses pematangan sperma. Gen yang menyandi protein yang terlibat dalam proses pematangan sperma diekspresikan secara spesifik pada epididimis dan ekspresinya diregulasi oleh androgen. Salah satu gen yang diduga berperan dalam proses pematangan sperma adalah gen Serpina1f. Berdasarkan urutan asam amino, Serpina1f dianggap sebagai anggota baru dari keluarga serpin dengan fungsi putatif sebagai serin protease inhibitor. Karakterisasi Serpina1f pada organ reproduksi pria khususnya epididimis dapat memberikan petunjuk mengenai perannya dalam proses pematangan sperma.

Tujuan : Mengkarakterisasi gen Serpina1f di epididimis mencit.

Desain : Penelitian ini menggunakan analisis bioinformatika dan eksperimental

Metode : Struktur gen, batas ekson-intron dan domain fungsional serta deteksi signal peptide pada Serpina1f dilakukan analisis bioinformatika. Untuk menganalisis ekspresi SERPINA1F tingkat protein dilakukan western imunoblotting, sedangkan untuk mengetahui lokasi protein SERPINA1F dilakukan imunohistokimia dan imunositokimia.

Hasil : SERPINA1F merupakan anggota family SERPIN. Berdasarkan analisis Signal peptide, SERPINA1F merupakan protein sekretori. Hasil imunohistokimia pada jaringan epididimis mencit menunjukkan adanya reaksi antibodi dengan terwarnainya nukleus dan sitoplasma pada sel epitel initial segment dan caput. Sedangkan pada corpus dan cauda SERPINA1F terdeteksi hanya pada sitoplasma. Hasil analisis western imunoblotting dan imunositokimia pada protein sperma menunjukkan adanya asosiasi SERPINA1F dengan spermatozoa dan terdapat di seluruh bagian spermatozoa.

Kesimpulan : SERPINA1F memiliki signal peptide pada asam amino 1 - 27 dan termasuk protein sekretori. Berdasarkan urutan asam aminonya, SERPINA1F yang termasuk famili SERPIN. Protein SERPINA1F diekspresikan di sel epitel initial segment, caput, corpus dan cauda. SERPINA1F berasosiasi dengan spermatozoa dan terdapat pada seluruh bagian spermatozoa.
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Background: Sperm maturation occur due to the interaction between the sperm cell and the proteins secreted by the epithelial cells lining the epididymis duct, causing morphological and biochemical changes in the sperm membrane. The secretion of proteins in epididymis duct is determined by genes that are expressed specifically in certain regions, for example in the region of the initial segment, caput, corpus or cauda that each segment forms microenvironment that is required for sperm maturation process. Genes that encode proteins involved in the process of sperm maturation in the epididymis specifically expressed and its expression is regulated by androgens. One of the genes thought to play a role in sperm maturation process is Serpina1f. Based on the amino acid sequence, Serpina1f considered as a new member of the serpin family with putative functions as a serine protease inhibitor. Characterization Serpina1f on male reproductive organs, especially the epididymis may provide a clue as to its role in sperm maturation process.

Objective: To characterize Serpina1f in the epididymis of mice.

Design: This study used a bioinformatics analysis and experimental.

Methods: Bioinformatics analysis were used to know gene structure, exon-intron boundaries and functional domains as well as the detection of signal peptide on Serpina1f. To analyze protein expression levels SERPINA1F performed western immunoblotting, whereas for the location of the protein immunohistochemistry and immunocytochemistry SERPINA1F done.

Results: SERPINA1F a member of the serpin family. Based on the analysis of signal peptide, a protein secretory SERPINA1F. The results of immunohistochemistry on epididymis tissue of mice showed an antibody reaction with colored nucleus and cytoplasm in epithelial cells of the initial segment and caput. While SERPINA1F detected only in the cytoplasm corpus and cauda. The results of western imunoblotting analysis and immunocytochemistry showed SERPINA1F associated with spermatozoa and found in all parts of the spermatozoa.

Conclusion: SERPINA1F has a signal peptide at amino acids 1-27 and include secretory proteins. Based on their amino acid sequence, which includes SERPINA1F serpin family. The protein is expressed in epithelial cells SERPINA1F initial segment, caput, corpus and cauda. SERPINA1F associated with spermatozoa and found on all parts.