

Studi Ekspresi dan Regulasi Gen Beta Defensin 2 pada Epididimis Mencit (*Mus musculus*) sebagai Model untuk Mempelajari Perannya dalam Pematangan Sperma = Study of Expression and Regulation of Beta Defensin 2 Gene in Mouse Epididymis (*Mus musculus*) as a Model for Understanding Its Role in Sperm Maturation

Andika Setyoadi, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20485539&lokasi=lokal>

Abstrak

Latar Belakang: Beberapa gen yang terekspresi spesifik di epididimis diduga terlibat dalam proses pematangan sperma. Karakteristik gen yang terlibat dalam pematangan sperma selain ekspresinya spesifik di epididimis juga dipengaruhi oleh androgen, faktor testikuler, dan terekspresi pada saat masa pubertas. Salah satu famili gen yang cukup banyak ditemukan terekspresi di epididimis adalah Beta Defensin. Gen Beta Defensin diketahui memiliki peran sebagai pertahanan terhadap mikroba, namun diduga memiliki keterlibatan dalam proses pematangan sperma karena ekspresinya banyak ditemukan di epididimis. Oleh karena itu, penelitian pada gen Beta Defensin terhadap perannya dalam proses pematangan sperma perlu dilakukan. Berdasarkan studi sebelumnya diketahui bahwa salah satu gen Beta Defensin yang terekspresi di epididimis yaitu Beta Defensin 2 (Defb2), namun karakterisasi terhadap gen ini belum dilakukan. Dengan demikian, pada penelitian ini bertujuan untuk mengkarakterisasi gen Defb2 terkait dengan perannya pada proses pematangan sperma.

Metode: Analisis bioinformatika digunakan untuk mendapatkan informasi mengenai struktur gen, signal peptide, dan domain fungsional pada gen Defb2. Analisis qRT-PCR untuk mengetahui ekspresi relatif gen Defb2 pada berbagai jaringan, regulasinya oleh androgen, pengaruh dari faktor testikuler dan ekspresinya pada perkembangan postnatal.

Hasil: Defb2 merupakan protein sekretori karena memiliki signal peptide. Defb2 memiliki domain fungsional berupa N-myristoylation dan protein kinase-C. Gen Defb2 terekspresi spesifik di epididimis khususnya pada bagian caput epididimis. Defb2 ekspresinya dipengaruhi oleh androgen terbukti setelah perlakuan gonadektomi, ekspresi Defb2 menjadi menurun dan kembali mengalami kenaikan ketika diberikan testosteron eksogen. Defb2 juga ekspresinya dipengaruhi oleh faktor testikuler terbukti setelah diberi perlakuan Efferent Duct Ligation (EDL) maka ekspresi Defb2 langsung menurun bahkan terjadi apoptosis sel sehingga pola ekspresi gen Defb2 sudah tidak bisa diamati. Begitu juga pada analisis postnatal development terlihat ekspresi gen Defb2 mulai terdeteksi jelas pada hari ke-15 yang merupakan masa pubertas mencit jantan.

Kesimpulan: Defb2 merupakan gen yang terlibat dalam proses pematangan sperma di epididimis yang dibuktikan dengan ekspresi spesifik di epididimis, diregulasi oleh androgen dan faktor testikuler, serta mulai terekspresi pada masa pubertas.

Background: Some of the specific genes expression in the epididymis are suspected to be

involved in the process of sperm maturation. Characteristics of the genes involved in sperm maturation in the epididymis-specific expression in addition also influenced by androgens, testicular factors, and expressed at the time of puberty. One of a family of genes that is pretty much found expressed in the epididymis is a Beta Defensins. Beta Defensin genes known to have a role as a defence against microbes, but suspected to have involvement in the process of sperm maturation because the expression is found in the epididymis. Therefore, research on Beta Defensin genes against its role in sperm maturation process needs to be done. Based on previous studies it is known that one of the Beta Defensin genes which expressed in the epididymis that is Beta Defensins 2 (Defb2), but the characterization of this gene has not been made against. Thus, this research aims to characterize genes associated with the Defb2 role in the process of sperm maturation.

Methods: Bioinformatics analysis was used to obtain information about the structure of genes, signal peptides, and functional domains of the Defb2 gene. qRT-PCR analysis to find out the relative gene expression of Defb2 on various tissue, regulation by androgens, the effect of testicular factors and its expression in postnatal development.

Results: Defb2 is a secreted protein because it has signal peptides. Defb2 has a functional domain in the form of N-myristoylation and kinase-C protein. Specific genes expression of Defb2 in the epididymis is especially in the caput epididymis. Defb2 expression influenced by androgens is proven after the gonadectomy, the expression of Defb2 to be decreased and start increase again when exogenous testosterone is given. Defb2 also its expression influenced by testicular factors that proven after being given the treatment by Efferent Duct Ligation (EDL), then the Defb2 expressions directly decreased and the cell apoptosis occurs even so that the pattern of gene expression Defb2 already could not be observed. So also on analysis of postnatal development seen gene expression Defb2 begins to be detected clearly at day 15 which is a male mice puberty.

Conclusions: Defb2 is a gene which is involved in the process of maturation of sperm in the epididymis that is evidenced by specific expression in the epididymis, be regulated by androgens and testicular factors, and as well as start expressed at puberty.