

ABSTRAK

Efek Ekstrak Etanolik *Curcuma longa* L dan Kurkumin pada Folikulogenesis Babi yang Dirangsang FSH, LH, dan PGF2 α : Kajian Ekspresi Reseptor Estrogen β , Reseptor Luteinizing Hormon, dan Protein Gas

Rul Afiah Syarif

Curcuma longa L, sebagai sumber kurkumin, secara empirik telah dikonsumsi masyarakat saat folikulogenesis untuk mencegah kehamilan. Penelitian sebelumnya mendapatkan bahwa kurkumin menghambat steroidogenesis dan diduga beraksi di *upstream* dari adenilat siklase dalam transduksi sinyal intrasel, seperti di LHR dan protein G. Estrogen reseptor β , LHR, protein Gas diperlukan dalam steroidogenesis dan folikulogenesis. Tujuan penelitian ini adalah untuk menetapkan efek ekstrak etanolik *C. longa* L (ECL) dan kurkumin terhadap ekspresi ER β , LHR, and Gas pada sel granulosa babi folikel sedang yang dirangsang FSH, LH, atau PGF2 α .

Penelitian ini merupakan penelitian eksperimental laboratorium dengan rancangan *post test-only control group*. Sel granulosa diisolasi dari folikel ukuran sedang ovarium babi dan disubkultur dalam medium kultur. Sel granulosa dirangsang FSH atau LH atau PGF2 α saja, atau dikombinasikan dengan ECL atau kurkumin secara berturut-turut konsentrasi 25, 50, dan 100 μ M dan 25, 50, and 100 μ g/mL. Setelah 24 jam perlakuan, medium kultur diperiksa kadar ekspresi LHR secara *enzymeimmunoassay* dan sel granulosa dikumpulkan untuk pemeriksaan ekspresi ER β secara *enzymeimmunoassay* dan dicat imunositokimia untuk dianalisa ekspresi protein Gas-nya. Data dianalisa dengan *one way-Anova*.

Ekspresi ER β pada sel granulosa yang dirangsang FSH atau LH dan diberi perlakuan ECL atau kurkumin lebih rendah daripada yang tidak diberi perlakuan ($p < 0,05$). Tidak ada perbedaan ekspresi ER β antara kelompok sel granulosa yang dirangsang PGF2 α dan diberi perlakuan ECL atau kurkumin dengan kelompok yang tidak diberi perlakuan ($p > 0,05$). Ekspresi protein LHR dan Gas pada sel granulosa yang dirangsang FSH dan LH tidak berbeda dibandingkan dengan yang diberi perlakuan ECL atau kurkumin ($p > 0,05$), sedangkan ekspresi LHR pada sel granulosa yang dirangsang PGF2 α dan diberi kurkumin atau ECL secara berturut-turut lebih tinggi ($p < 0,05$) dan tidak berbeda ($p > 0,05$) dibandingkan dengan kelompok yang tidak diberi perlakuan.

Ekstrak etanolik *C. longa* L dan kurkumin mampu mengganggu folikulogenesis dengan cara menurunkan ekspresi ER β pada sel granulosa yang dirangsang FSH atau LH dari folikel babi ukuran sedang.

Kata kunci: *Curcuma longa* L; kurkumin; sel granulosa; reseptor estrogen β , reseptor Luteinizing Hormone, protein Gas

ABSTRACT

Effect of *Curcuma longa* L Ethanolic Extract and Curcumin on FSH-, LH-, and PGF2 α -Stimulated Pigs Folliculogenesis: Study on Expression of Estrogen Receptor- β , Luteinizing Hormone Receptor, and G α s Protein

Rul Afiyah Syarif

Empirically *Curcuma longa* L, a major resource of curcumin, has been consumed during folliculogenesis to prevent pregnancy. The previous study found that curcumin inhibited steroidogenesis and suggested that the action mechanism was upstream of adenylat cyclase in intracellular signal transduction such as receptor of LH and G protein. Estrogen receptor β , LHR, G α s protein are required in steroidogenesis and folliculogenesis. The aims of the study were to determine the effect of *C. longa* L ethanolic extract and curcumin on expression of ER β , LHR, and G α s protein in FSH-, LH-, and PGF2 α -stimulated pig granulosa cells of medium follicles.

It was an experimental laboratory study with post test-only control group design. Granulosa cells were isolated from medium follicles (3-5 mm in diameter) of pig ovaries and sub cultured in medium culture. Cultured granulosa cells were stimulated for 24 hours with FSH, LH or PGF2 α alone, or in combination treatment with three different concentrations of curcumin or ethanolic extract of *C. longa* L (25, 50, and 100 μ M or 25, 50, and 100 μ g/mL, respectively). The medium culture was collected to analyze the expression of LHR by enzymeimmunoassay, granulosa cells were collected for ER β expression analysis by enzymeimmunoassay and performed immunocytochemical staining for G α s protein expression analysis. Data were analyzed using one way-Anova.

Protein expression of ER β in FSH- or LH-stimulated pigs granulosa cells treated by ethanolic extract of *C. longa* L or curcumin was lower than in pig granulosa cells stimulated by FSH or LH alone ($p < 0,05$), whereas administration of ethanolic extract of *C. longa* L or curcumin on PGF2 α -stimulated granulosa cells did not showed a different ER β expression to PGF2 α -stimulated granulosa cells alone ($p > 0,05$). Protein expression of LHR and G α s on FSH- and LH-stimulated pig granulosa cells were not different compared with those treated by ethanolic extract of *C. longa* L or curcumin ($p > 0,05$), whereas LHR expression in PGF2 α -stimulated granulosa cells treated curcumin or ethanolic extract of *C. longa* L were higher ($p < 0,05$) and not different ($p > 0,05$) compared to that untreated groups, respectively.

Ethanolic extract of *C. longa* L and curcumin were able to disturb steroidogenesis and folliculogenesis by decreasing protein expression of ER β in FSH- or LH-stimulated granulosa cells of pig medium follicles.

Key words: *Curcuma longa* L; curcumin; granulosa cells; Estrogen Receptor- β , Luteinizing Hormone Receptor, G α s Protein