

Vika Yudiastri. 2006. **Kemampuan Polisakarida Krestin (PSK) dalam Mencegah Munculnya Kelainan Perkembangan Otak dan Kelainan Eksternal Fetus Mencit (*Mus musculus*) Akibat Iradiasi Sinar Gamma Cobalt⁶⁰**. Skripsi ini dibawah bimbingan Drs. Win Darmanto, M.Si. Ph.D. dan Drs. I.B. Rai Pidada, M.Si. Jurusan Biologi. Fakultas Matematika dan Ilmu Pengetahuan Alam. Universitas Airlangga.

ABSTRAK

Efek radiasi pengion pada masa awal organogenesis kehamilan telah diketahui bersifat teratogenik yang dapat menyebabkan keterbelakangan mental, kelainan *Central Nervous System* (CNS), kelainan sistem skeleton dan penglihatan. Telah diketahui juga bahwa Polisakarida Krestin (PSK) sebagai *Biological Respon Modifier* (BRM) mampu mencegah munculnya kelainan hidrosefalus akibat radiasi sinar-X.

Penelitian ini bertujuan untuk mengetahui kemampuan PSK dalam mencegah kelainan perkembangan otak dan kelainan eksternal pada fetus mencit akibat iradiasi sinar Gamma Cobalt⁶⁰. Pada penelitian ini digunakan 18 ekor mencit (*Mus musculus*) betina bunting strain BALB/C yang berumur 8-9 minggu dengan berat badan 25-30 gram. Penelitian ini dibagi menjadi 3 kelompok perlakuan (P₁, P₂ dan kontrol). Tiap kelompok perlakuan terdiri dari 6 ekor mencit betina. Untuk kelompok perlakuan pertama (P₁), induk mencit bunting diradiasi sinar Gamma Cobalt⁶⁰ dosis 2 Gy pada umur kebuntingan 13 hari. Kelompok perlakuan kedua (P₂), induk mencit bunting diradiasi sinar Gamma Cobalt⁶⁰ pada umur kebuntingan 13 hari dan diberikan PSK dosis 200mg/kg BB melalui *gavage* 24 jam sebelum dan 1 jam sesudah iradiasi. Sedangkan kelompok kontrol tidak diberi perlakuan apapun. Seluruh induk pada masing-masing kelompok dibedah pada umur kebuntingan 18 hari. Data pengamatan berupa persentase kelainan eksternal yang dianalisis dengan uji Mann-Whitney, sedangkan data kelainan mikrosefali dan hidrosefali dianalisis secara deskriptif.

Hasil dari penelitian ini menunjukkan bahwa, radiasi sinar Gamma Cobalt⁶⁰ memunculkan kelainan eksternal dan kelainan perkembangan otak pada P₁ dan P₂. Kelainan eksternal yang terjadi antara lain hematoma, *kinky tail*, brakhidaktili, sindactili dan talipes. Sedangkan kelainan yang terjadi pada perkembangan otak antara lain mikrosefali dan hidrosefali, diamati dengan mengukur tebal cerebral cortex dan lebar ventrikel lateral. Dari hasil penelitian, didapatkan bahwa persentase kelainan eksternal secara umum dan kelainan perkembangan otak pada P₂ mengalami penurunan bila dibandingkan dengan dengan P₁.

Pada penelitian ini dapat disimpulkan bahwa pemberian PSK dosis 200 mg/kg BB 24 jam sebelum dan satu jam setelah iradiasi sinar Gamma Cobalt⁶⁰ dapat menurunkan kelainan eksternal dan kelainan perkembangan otak fetus mencit akibat iradiasi sinar Gamma Cobalt⁶⁰.

Kata kunci : Kelainan perkembangan otak, kelainan eksternal, fetus mencit, Sinar Gamma Cobalt⁶⁰, Polisakarida Krestin

Yudiastri, Vika. 2006. **Capability of Polysaccharide Krestine in Preventing Brain Defect and External Malformation in Mice (*Mus musculus*) Fetuses by Irradiation of Cobalt⁶⁰ Gamma Rays**. This thesis is under advisory of Drs. Win Darmanto, M.Si., Ph.D. and Drs. I.B. Rai Pidada, M.Si. Department of Biology. Faculty of Mathematics and Natural Sciences. Airlangga University.

ABSTRACT

The effect of ionizing radiation in early organogenesis periodic of gestation has been known to provide a teratogenic effects causing mental retardation, anomalies of central nervous system and vision, and also skeletal malformation. It also has been known that PSK, as biological response modifier, has ability to prevent hydrocephalus caused by X-ray irradiation.

In this present study, brain defect and external malformation of Irradiation Cobalt⁶⁰ Gamma rays by PSK were observed. Pregnant mice (*Mus musculus*) BALB/C, aging 8-9 weeks and weighing 25-30 grams, and was divided into 3 groups of treatments (P₁, P₂ and control) consisting 6 female mice in each group. In first group (P₁), pregnant mice were irradiated with Cobalt⁶⁰ Gamma rays at dose of 2 Gray (Gy) on gestation day 13 (GD 13). In the other group (P₂), pregnant mice were also irradiated with Cobalt⁶⁰ Gamma Rays at dose of 2 Gy on GD 13, but 24 hours before and 1 hour after radiation they were given a single oral dose of 200 mg PSK/kg body weight (BW) by gavage. In the control group, pregnant mice were neither irradiated nor injected PSK. All pregnant mice at GD 18 were killed and embryos were observed. The percentage of external malformation data were analyzed by Mann-Whitney test, while brain defect data such as microcephaly and hydrocephaly, were analyzed descriptively.

The data showed that the irradiation of Cobalt⁶⁰ Gamma rays induced external malformation and brain defect in P₁ and P₂. The external malformation were observed, such as; hematoma, kinky tail, brachidactyli, syndactyli and talipes. While the brain defect microcephaly and hydrocephaly were observed by measure the thickness of cerebral cortex and the width of lateral ventricle, respectively. From this research, brain defect and the percentage of external malformation in P₂ were significantly reduced compared to P₁.

The conclusion of this research shown that the treatment of PSK at dose of 200 mg/kg BW 24 hours before and 1 hour after irradiation of Cobalt⁶⁰ Gamma Rays in female mice in GD 13 could reduce brain defect and external malformation in mice fetuses which is caused by irradiation of Cobalt⁶⁰ Gamma rays.

Key words : Brain defect, external malformation, mice fetuses, Cobalt⁶⁰ Gamma Rays, Polysaccharide Krestine