Pemajanan toluena subakut di bawah nilai ambang batas terhadap gambaran sel spermatogonia a rattus strain wistar = Exposure of subacute toluene below the threshold limit values against the spermatogenia a cells in wistar strain rats

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Abstrak

Pendahuluan: Di Indonesia toluena merupakan zat kimia yang banyak digunakan dalam bidang industri saat ini. Nilai Ambang Batas (NAB) menurut Surat Edaran Menteri Tenaga Kerja No. SE-01/MEN/1997 untuk toluena adalah 50 ppm. Toluena dapat mempengaruhi seluruh organ baik secara akut maupun kronis termasuk proses spermatogenesis. Data pajanan toluena yang mempengaruhi spermatogenesis masih terbatas dan kontroversial.
Metode: Disain penelitian menggunakan true experimental dengan mencari hubungan antara variabel bebas dosis pajanan (toluena) dengan variabel terikatnya yaitu kadar malondialdehyde (MDA) di dalam jaringan darah, testikel serta jumlah sel spermatogonia A tikus wistar jantan. Proses pajanan dibagi menjadi lima kelompok yang berbeda (12,5 part permillion [ppm], 25 ppm, 50 ppm, 100 ppm, dan kontrol dengan pemajanan dilakukan 4 jam tiap hari selama 14 hari. Penilaian MDA menggunakan metode periodic acid Schiff (PAS) dan perhitungan Jumlah Sel Spermatogonia A menggunakan rumus Abercrombie.
Hasil: Pemajanan toluena secara statistik bermakna (p=0.005) menyebabkan penurunan terhadap Jumlah Sel Spermatogonia A. Jumlah Sel Spermatogonia A sudah mulai mengalami penurunan pada pajanan toluena 12,5 ppm. Pada uji korelasi Spearman didapatkan r=-0.683 dan p<0.001 antara tingkat pajanan toluena dengan Jumlah Sel Spermatogonia A.
Kesimpulan: Pemajanan toluena selama 2 minggu sebesar 12,5 ppm sudah dapat menganggu sel Spermatogenia A.
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Introduction: Currently in Indonesia, toluene is a chemical that is widely used in the industrial field. Threshold Limit Values (TLV) for toluene according to the Minister of Labour Circular Letter No. SE-01 /MEN/1997 is 50 ppm. Toluene can affect all organs of both acute and chronic, including the process of spermatogenesis. The availability of data regarding the toluene exposure which can affect the spermatogenesis is still limited and therefore it is also still controversial.
Methods: This study is a true experimental research design aimed to find the correlation between the independent variable, which is the exposure dose (toluene) and the dependent variable, i.e. the of level of malondialdehyde (MDA) in the blood tissue and testicles, and the number of spermatogenia A cells of male Wistar rats. Exposure process is divided into five distinct groups (12.5 parts permillion [ppm], 25 ppm, 50 ppm, 100 ppm, and control, where the rats are exposed 4 hours per day for 14 days). MDA level is assessed by using the Thiobarbituric Acid Reactive Substances (TBARS) method. Testical staining is done by using the Periodic Acid Schiff (PAS) and numbers of the spermatogenia A cells are calculated by using the Abercrombie formula.
Results: This study indicates that toluene exposure significantly led to a reduction of the number of spermatogenia A cells (p=0.005). Number of spermatogenia A cells has started to decline at 12.5 ppm of

toluene exposure. Spearman correlation test between the toluene exposure levels and the number of spermatogenia A cells shows $r=0.683$ ($p<0.001$).
Conclusion: Toluene exposure for 2 weeks at 12.5 ppm has appeared to be able to disrupt the number of spermatogenia A.