

Studi pembentukan DNA adduct 8-OHdG sebagai biomarker risiko kanker secara in vivo pada tikus (*rattus norvegicus*) dan in vitro pada 2'-deoksiganosin melalui reaksi fenton-like dengan logam tembaga (II) = The study of DNA adduct 8-OHdG formation as a cancer risk biomarker as in vivo on rats (*rattus norvegicus*) and in vitro study on 2'-deoxyguanosine through fenton-like reaction with Cu (II) metals

Anindya Silva Putri Hindarsyah, author

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Abstrak

**ABSTRACT**

Penelitian ini dilakukan untuk menganalisis pembentukan DNA Adduct 8-OHdG akibat kerusakan oksidatif DNA yang disebabkan oleh paparan formaldehida dan logam Cu (II). Studi in vivo dilakukan dengan menggunakan kelompok tikus putih (*Rattus norvegicus*) yang diberi paparan formaldehida (82 mg/kg BB) dan Cu (II) (10 mg/kg BB) selama 28 hari. Sampel urin diambil setiap minggunya. Studi in vitro dilakukan dengan mereaksikan 2-deoksiganosin dengan formaldehida, logam Cu (II), dan H<sub>2</sub>O<sub>2</sub> melalui reaksi Fenton-like. Reaksi dilakukan pada suhu 37°C dengan variasi pH (7,4 dan pH 8,4) serta waktu inkubasi (7 dan 12 jam). Analisis pembentukan 8-OHdG secara in vivo dan in vitro dilakukan menggunakan instrumen LC-MS/MS dengan kromatografi fasa terbalik. Fasa gerak yang digunakan adalah campuran amonium asetat 20 mM pH 4 dan asetonitril dengan gradien elusi. Hasil dari penelitian menunjukkan bahwa paparan formaldehida dan logam Cu (II) dapat menyebabkan terbentuknya DNA Adduct 8-OHdG. Pada studi in vivo, ditemukan kadar 8-OHdG tertinggi pada kelompok paparan formaldehida dengan Cu (II). Pada studi in vitro, terbentuk 8-OHdG dengan konsentrasi paling tinggi pada kelompok variasi formaldehida, Cu (II) dan H<sub>2</sub>O<sub>2</sub>.

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**ABSTRACT**

This research was conducted to analyze the formation of DNA Adduct 8-OHdG due to oxidative DNA damage caused by exposure formaldehyde and Cu (II). In vivo studies were conducted using a group of rat (*Rattus norvegicus*) which were exposed to formaldehyde (82 mg/kg BW) and Cu (II) (10 mg/kg BW) for 28 days. Urin samples were taken every week. In vitro studies were carried out by reacting 2-deoxyguanosine with formaldehyde, Cu (II) and H<sub>2</sub>O<sub>2</sub> through a Fenton-like reaction. The reaction was carried out at 37°C with variation in pH (7,4 and 8,4) and incubation time (7 and 12 hours). Analysis of the formation DNA Adduct 8-OHdG with in vivo and in vitro studies using LC-MS/MS with reverse phase chromatography. The mobile phase used was a mixture of 20 mM ammonium acetate pH 4 and acetonitrile with elution gradient. The results of the study show that exposure of formaldehyde and Cu (II) can cause the formation of a DNA Adduct 8-OHdG. In vivo study showed that the highest levels of 8-OHdG were found in the group that exposed to formaldehyde with Cu (II). In vitro study showed that 8-OHdG was formed with the highest concentration in the formaldehyde, Cu (II) and H<sub>2</sub>O<sub>2</sub> variation groups.