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**Characterization of Directly Acting Mutagens Produced from  
*N*-Nitroso-*N*-(formylmethyl) alkylamines : Their Possible  
Involvement in the Carcinogenesis of *N*-Nitrosamines  
Having a 2-Hydroxyethyl Group\***

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Directly acting mutagens formed from *N*-nitroso-*N*-(formylmethyl) alkylamines (3) were isolated and identified as *N*-nitroso-*N*-alkyl-1-hydroxyimino-2-oxoethylamines (4). Their structures were elucidated on the basis of nuclear magnetic resonance spectra and confirmed by derivatization to the crystalline 2,4-dinitrophenylhydrazones (5). Compounds 4 (alkyl=ethyl and butyl) were strongly mutagenic to *Salmonella typhimurium* TA1535 and *Escherichia coli* WP2 *hcr*<sup>-</sup> without metabolic activation, while 4 with a tert-butyl group was not mutagenic. The formation of 4 is considered to proceed by the nitrosation of 3, indicating a possible involvement of the formyl-methyl metabolite in carcinogenesis by *N*-nitrosamines with a 2-hydroxyethyl group.

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