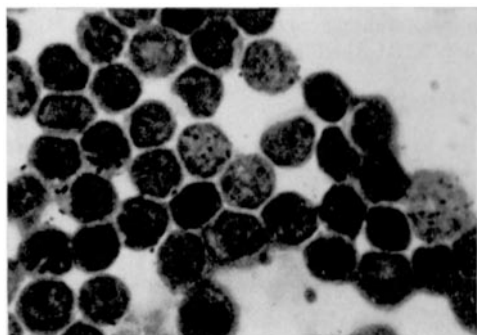


marked incorporation of tritiated uridine by lymphocyte slides prepared from suspensions obtained by the above-described method (Figure).



Very satisfactory results were obtained with the same method for isolating myelocytic cells from granulocytes in cases of chronic myeloid leukemia.

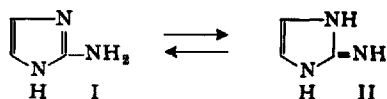
**Riassunto.** Viene descritto un metodo che consente di isolare una buona quantità di linfociti, completamente privi di eritrociti e di piastrine. Il metodo è basato sull'azione emolitica del  $\text{NH}_4\text{Cl}$  e sulla ritenzione dei granulociti e delle piastrine ad opera del cotone. Questo metodo è risultato molto soddisfacente anche per isolare le cellule di tipo mielocitario dai granulociti dal sangue di pazienti con leucemia mieloide cronica.

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## The Synthesis of Azomycin (2-Nitroimidazole)

Azomycin (2-nitroimidazole), an antibiotic active against *Trichomonas vaginalis*, has been isolated by several authors<sup>1-4</sup> from culture filtrates of different *Streptomyces* species. We have now carried out a synthesis of this compound through diazotization of 2-aminoimidazole followed by the Gattermann reaction with sodium nitrite (the nitration of imidazoles gives the 4 (or 5) derivatives only<sup>5</sup>). The aromatic character of 2-aminoimidazole (I) was discussed by BURTLES and PYMAN<sup>6</sup> who concluded that it could be better represented by the 2-imino-2,3-dihydroimidazole structure (II). Their opinion was based upon the fact that 2-aminoimidazole does not yield a benzylidene derivative with benzaldehyde<sup>7</sup> and does not couple with naphthols after treatment with nitrous acid<sup>8</sup>. Actually, in the reaction with nitrous acid in the presence of hydrochloric or acetic acid, a deep red colour was obtained by adding sodium hydroxide to the solution; this was interpreted<sup>9</sup> as a formation of a 4 (or 5) nitroso derivative. However, it is also possible to assume that 2-aminoimidazole reacts with nitrous acid as an aromatic amine (structure I), giving a diazo derivative which partially couples with itself yielding the red colour.



This assumption proved to be correct when 2-nitroimidazole was obtained, though in very poor yield, by treating 2-aminoimidazole dissolved in HCl with an excess of sodium nitrite, followed by addition of cuprous sulphite and sodium nitrocobaltate. Higher yields (about 30%) were obtained when 2-aminoimidazole hydrochloride (2.88 g) was diazotized in 40% fluoboric acid (13 ml) with sodium nitrite (1.67 g) and the resulting solution was treated with sodium nitrite (24.7 g in 50 ml of water) and copper powder (4.9 g). The 2-nitroimidazole (775 mg, m.p. 284°) was readily recovered from the acidified reaction mixture by extraction with ethyl acetate, evaporation of the solvent and recrystallization of the

residue from ethanol. The product thus obtained and a sample of azomycin produced by fermentation showed identical melting points, UV- and IR-spectra and antimicrobial activity.

The demonstration that 2-aminoimidazole can be diazotized opens a way to the synthesis of a number of 2-substituted imidazoles. Thus, it was thought to be interesting to try the same reaction on an N-alkyl imidazole. Diazotization of 1-methyl-2-aminoimidazole<sup>9</sup> in fluoboric acid and treatment as described above with nitrite and copper powder gave 1-methyl-2-nitroimidazole (m.p. 100-102°, yield 30%) identical with the product obtained by methylation of azomycin<sup>10</sup>.

**Riassunto.** La sintesi del 2-nitroimidazolo e del 1-metil-2-nitroimidazolo per diazotazione e reazione di Gattermann a partire dai corrispondenti 2-aminoimidazoli dimostra che, in determinate condizioni, questi ultimi si comportano come composti a carattere aromatico.

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