Role of bacterial growth inhibitors in urine in diagnostic culture

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SYNOPSIS Frequently no growth is obtained on ordinary cultures from urines of patients with typical symptoms of infection, and sometimes not even from those with pyuria. The possibility that this could be due to antibacterial substances—whether endogenous or exogenous from non-specific medication—has been investigated.

Materials and Methods

Fresh midstream or 'clean-catch' urines from consecutive patients clinically diagnosed as cases of urinary infection and receiving no specific antimicrobial therapy or antibiotics were cultured by a semiquantitative method, and any growth was interpreted as infection or contamination (Stokes, 1960). At the same time a sterile disc of Whatman no. 1 filter paper, 6.25 mm in diameter, was dipped in the urine, the excess fluid drained by the side of the bottle, and the disc laid on a nutrient agar lawn of a six-hour broth culture of an *Escherichia coli* strain sensitive to streptomycin, chloramphenicol, tetracyclines, sulphonamides, and nitrofurantoin. A similar disc was placed on a lawn of the Oxford strain of *Staphylococcus aureus*. After overnight incubation at 37°C inhibitions of growth of the lawns were scored as moderate (inhibition zone diameter 0.8-3 cm) or strong. The last few urines were checked for the presence of salicylates by the ferric chloride test and for barbiturates by the Parri test (Connors, 1961).

Results and Conclusions

Of the 114 specimens tested, 29 showed true infections, namely, *E. coli* 13, proteus 2, pseudomonas 3, paracolon 5, *Staph. aureus* 1, and faecal streptococcus 5. Twenty were contaminated. All 49 (43%) were grouped as urines showing growth. The remaining 65 specimens produced no growth. It is evident from the Table that there was no noticeable difference between the two groups. About 40% of urines with inhibitors

Urine Culture		Staphylococcus Inhibitor		E. coli Inhibitor	
		Present	Absent	Present	Absent
Growth		8/43	35/43	8/49	41/49
	Salicylate	0/1	1/16	0/1	1/16
	Barbiturate	0/1	2/16	0/0	2/17
No growth		12/56	44/56	11/60	49/60
	Salicylate	1/7	2/22	2/8	1/22
	Barbiturate	1/8	3/26	3/11	1/23

Table Incidence of growth inhibitors, salicylate, and barbiturates in urine specimens expressed as number positive/number tested

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showed growth, like urines with no inhibitors. This was also true when one considered strong inhibitions only. Presumably the inhibitors were diluted to insignificance through diffusion in the culture plate. The possibility that they could reduce the viable count of stored specimens has not been excluded.

Eight urines inhibited *E. coli* only, nine staphylococcus only, and 11 both. Thus about half the inhibitors, including five strong ones, were selective in action. Some were equally active after storage for two months at about 6°C. The chemical nature of the inhibitors has not been identified but it may be speculated that they are mainly from diet. The people at Manipal are almost exclusively strict vegetarians, which might have ensured a large supply of the vegetable

antibacterials like paciferrins. Leaves and tubers of *Arum* spp, one of the most popular dishes, contain enough oxalate crystals to cause itching of the mouth. Moreover, the people of Manipal take excessive amounts of spice, even by Indian standards, and turmeric is about as effective as acriflavine for some bacteria.

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