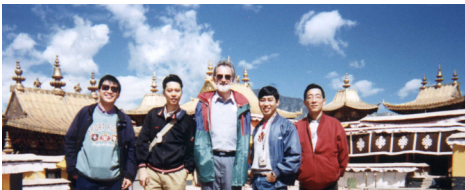


ORAL YEAST AND COLIFORMS CARRIAGE OF TIBETANS IN LHASA.

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We investigated the oral colonization of yeasts and coliform bacteria in a cohort of Tibetans living in Lhasa City, Tibet Autonomous Region, China. Random samples of children (n=50) and adults (n=38) were selected from a pool of 340, 11-13 year-olds (from 2 primary schools) and from a pool of 160, 25-44 year-olds (from 4 governmental or local agencies). These subjects were recruits of a concurrent epidemiological survey. Mean ages for children/adults were 11.6±0.9 years/37.1±6.1 years and 38%/60% were female. All subjects had lived in Tibet since birth. Oral rinse samples were collected, as described previously (Samaranayake et al. J Oral Pathol Med, 1986, 15:386), spiral plated and cultured using conventional techniques. Oral yeast and coliform bacteria isolation rates for children/adult groups were 14%/50% and 84%/34% respectively. Mean yeast and coliform colony forming units (cfu) per mL oral rinse from children/adults was found to be 1.5±7.2 cfu/6.4±13.7 cfu and 37.4±68.9 cfu/16.7±89.6 cfu per mL. There was no statistically significant difference between the count (cfu) of yeasts or coliforms per mL oral rinse isolated from females or males in both the children and adults. This preliminary study showed that native Tibet inhabitants especially children appear to have high oral carriage rate of coliform bacteria. We postulate that this might be due to their unique dietary habits and/or lower standards of general hygiene.

INTRODUCTION

Tibetans are one of the few tribal groups that reside at high altitude. Their unique living conditions and life-style may have effects on the flora that transiently inhabit their oral cavities. The present study was conducted to investigate the colonization pattern of aerobic or facultative anaerobic gram-negative rods and cocci (AGNR & C) and oral yeasts in Tibetan children and adults.

ABSTRACT

MATERIALS AND METHODS

Subjects:

- Random sampling of 50 children from a pool of 340, 11-13 year-old primary school pupils (2 schools).
- Random sampling of 40 adults from a pool of 160, 25-44 year-old individuals (from 4 governmental/local agencies).

Laboratory investigations:

- Oral rinse sampling was carried out as per Samaranayake *et al.* 1986. AGNR & C from the samples were isolated, identified and quantified using MacConkey’s agar and API 2 0E kit. Oral Yeasts from the samples were isolated using Sabouraud’s dextrose agar.

RESULTS

Table 1. Demography of Subjects.

	Child	Adult
n	50	38
Age (mean±SD)	11.6 ± 0.9	37.1 ± 6.1
% female	38	60

Table 2. Number (mean±SD) of species of AGNR & C families and yeast isolated from oral rinse samples.

	Child	Adult
Total AGNR & C	0.9 ± 0.5	0.5 ± 0.8
Pseudomonadaceae	0.8 ± 0.4	0.1 ± 0.3
Enterobacteriaceae	0.0 ± 0.1	0.3 ± 0.7
Total yeast	0.1 ± 0.4	0.5 ± 0.5

Table 3. Frequency (in percentage) of AGNR & C species and yeasts isolated from oral rinse samples.

	Child	Adult
Total AGNR & C	84.0 ^{a,b}	34.2 ^{a,b}
Pseudomonadaceae	82.0	13.2
Pseudomonas fluoresence/putida	0	5.2
Pseudomonas paucimobilis	0	2.6
Stenotrophomonas maltophilia	82.0	5.2
Enterobacteriaceae	2.0	15.8 ^a
Citrobacter diversus/amalonaticus	0	2.6
Enterobacter agglomerons	0	2.6
Enterobacter cloacae	0	2.6
Enterobacter sakazakii	2.0	
Erwinia nigrifluens	0	2.6
Escherichia coli	0	2.6
Klebsiella oxytoca	0	2.6
Klebsiella pneumoniae subsp. pneumoniae	0	7.9
Serratia liquefaciens	0	2.6
Unidentified/lost	4	7.9
Yeasts	14.0	50.0

^a Total or sub-total value does not add up because some samples contain more than one species of the same family.
^b Unidentified species included.

Table 4. Total count (cfu/mL) of cultivable AGNR & C species and yeasts from oral rinse samples.

	Child	Adult
Total AGNR & C	37.4 ± 68.9	16.7 ± 89.6
Pseudomonadaceae	35.2 ± 67.4	0.9 ± 4.4
Pseudomonas fluoresence/putida	0	0.7 ± 4.4
Pseudomonas paucimobilis	0	0.0 ± 0.1
Stenotrophomonas maltophilia ^a	35.2 ± 67.4	0.2 ± 0.9
Enterobacteriaceae	0.2 ± 1.2	15.8 ± 89.7
Citrobacter diversus/amalonaticus	0	0.1 ± 0.3
Enterobacter agglomerons	0	0.3 ± 1.9
Enterobacter cloacae	0	0.0 ± 0.1
Enterobacter sakazakii	0.2 ± 1.2	0
Erwinia coli	0	7.3 ± 44.8
Escherichia nigrifluens	0	0.0 ± 0.1
Klebsiella oxytoca	0	7.4 ± 44.8
Klebsiella pneumoniae subsp. pneumoniae	0	0.4 ± 1.9
Serratia liquefaciens	0	0.3 ± 1.9
Unidentified/lost	2.0 ± 11.2	0.0 ± 0.1
Yeasts	1.5 ± 7.2	6.4 ± 13.7

^a Significance higher total count of *S. maltophilia* was isolated in oral rinse from Tibetan child than adult, ANOVA, *p* < 0.005.

DISCUSSION

- The native Tibetans studied also harboured oral yeasts and AGNR & C which were found to be at levels comparable to other population/study groups (except that children exhibited higher AGNR & C carriage).
- Very high recovery of *Stenotrophomonas maltophilia* – an AGNR which could be acquired from the environment - was found from Tibetan children. We postulate that this occurrence might be due to the generally poor hygiene of the kids or some as yet undetermined dietary habits. One possible sign of the less than optimal hygienic environment was the lack of hand washing facilities and “dry toilet” in both primary schools surveyed. *S. maltophilia* is known to possess multi-antimicrobial resistant determinants, thus the relevance of the high *S. maltophilia* colonization in Tibetan kids is worthy of further study.



CONCLUSION

1. Native Tibet inhabitants harbour oral yeasts and AGNR & C.
2. The AGNR & C isolated included various species from the *Pseudomonadaceae* and *Enterobacteriaceae* families.
3. The prevalence and quantity (cfu/mL) of *Stenotrophomonas maltophilia* isolated from oral rinse of Tibetan children was significantly higher than that of Tibetan adults.