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Changes in mycoflora of man's respiratory system – observed during last some years – yeasts

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This work is an fragment of research concerning the composition of yeasts in man's respiratory system. The research of some last years suggested that *Candida* (so far dominating) make room for *Trichosporon* fungi. Besides new species as: *Debaryomyces hanseni*, *Yarrowia* or *Pichia* appear lately. Those changes may be being connected with occurring new chemotherapeutics and still getting worse habitat.

INTRODUCTION

Observation made between 1986-1992 concerning mycoflora of patients of Department of Tuberculosis Lung Disease and Oncology in Olsztyn showed clear changes in the species composition and intensity of growth of each species.

MATERIAL AND METHODS

Research materials were delivered from respiratory system – swabs from oral cavity and throat, sputum and bronchitis lavatia. The culture was conducted according to general bases in mycological laboratories – using the breeding – grounds Sabouraud's (culture of plate) and Nickerson's (microculture) and completing, when the growth was weak, with rice agar.

In identification of species API tests (API 20°C and API 20°C AVX) were being used and works of O t č e n a š e k and D w o ř a k (1973), R i e t h (1983), K r e g e r - v a n R i j et al. (1984) and B a r n e t t et al. (1990). From practical reasons all isolated fungi were set according to taxonomy of K r e g e r - v a n R i j et al. (1984), on which actual laboratory diagnostics is based.

Evaluating the frequency of occurring – the following criterions were made: often repeated species – 4, repeated species – 3, rare – 2, very rare – 1.

When the whole surface of culture was regularly convered with colonies of fungus – it was considered as very large growth, when the fungus convered between 1/2 till 3/4 of surface – as large, when the fungus covered less than half of surface – – as moderate.

RESULTS

During research 18561 samples were analysed (Tab. 1), among them 6131 tribes of yeasts belonging to 16 species (Tab. 2) were isolated.

Between 1986-1989 positive results showed the tendency of falling, since 1990 – – a very clear growth of them was observed (Fig. 1).

Table 1

Proportional contribution of fungi in material having being researched – with regard to intensivity of growth

Year	Number of tests	Findings positive %	Intensivity of growth
1986	2752	894 – 32.5	resonable
1987	2610	1024 – 39.2	"
1988	2901	855 – 29.5	"
1989	3105	795 – 25.6	abundant
1990	3363	877 – 26.0	very abundant
1991	2131	936 – 43.9	"
1992	1699	750 – 44.1	"

Fig. 1. Changes in number of fungi being researched between 1986-1992

Table 2
Yeasts isolated from respiratory system – between 1986-1992

Species	Valuation of occurring in each year						
	1986	1987	1988	1989	1990	1991	1992
Candida albicans Berkhout	3	3	4	4	3	3	3
C. intermedia Lang. et Guerra	1	1	1	1	1	2	1
C. parapsilosis Lang. et Guerra	4	4	4	3	3	2	1
Cryptococcus sp.	1	1					
Debaryomyces hanseni Zopf						1	1
Geotrichum candidum Link ex Pers.	1	1	1	1	1		1
Kluyveromyces marxianus van der Walt	2	2	2	2	2	2	1
Pichia farinosa Hansen						1	1
P. guilliermondii Lang. et Guerra	3	3	3	2	2	1	1
P. jadinii Kurtzman	1	1	2	2	2	1	1
P. membranaefaciens Hansen	3	3	3	3	1	2	1
Saccharomycopsis capsularis Schiönning,						1	2
S. cerevisiae Hansen,	1	1	1	2	2	2	2
Trichosporon beigelii Vuill.					1	2	3
T. pullulans Diddens et Loedder						2	3
Yarrowia lipolytica Walt ex Arx.					1	2	

DISCUSSION

Yeasts belonging to opportunistic microorganisms, it means: being physiological flora which gets virulent in specified circumstances of unsettle of balance between the state of goot health of an organism and microorganisms.

Species which have an ability of creating of a disease changes are now evaluating quite differently than some years ago. On the one hand – one must pay attention to elements which make occurring of symptoms of yeasts disease easier (general serious sicknesses, immunological shortage, using immunosuprecist drugs, cytostatics, antibiotics, corticosteroids). On the other hand – a proper differentiation of pathogenic and non pathogenic yeasts is very important. Occurring very serious disease symptoms is connected not only with the reduction of an organism or with the dangerously appearing existence of reproduction of yeasts cells but also with the changes of propriety of them (S c h a b i ń s k i, 1966; R i e t h, 1983). It concerns mainly facultative pathogenic yeasts in which the ability of causing process may show itself only in proper conditions.

The reasons still appearing of growth of mycosis meed further research. The theory of universal antagonism between bacteria and fungi is not confirmed practically. M a j e w s k i (1973) suggests that there is a symbiosis between fungi and bacteria, particularly with *Staphylococcus*. It's thought that changing of penetrability of epithelium mucons membrane for yeasts has certain meaning to people cured

intensively with antibiotics. If this is the sase, there is large probability of penetrating of fungi to lymph and blood vascular systems and in consequence of placing fungus elements in internal organs without seeing protective reaction (Meinhof, Keller, 1976; Rieth, 1983). Schabiński (1960) and Dynowska (1992) showed that some antibiotics influence directly and stimulating the growth of yeasts. Rieth's research (1983) showed that capsules with medicine are sometimes made from the material, which in contrary to antibiotic placet inside is propitious to the growth of yeasts.

In man's respiratory system the *Candida* (mainly *C. albicans*), *Geotrichum*, *Rhodotorula*, *Torulopsis* and *Cryptococcus* (Brzeziński et al., 1972; Kowszyk-Gindifer, Sobiczewski, 1986; Merle, 1986; Geraint, Peter, 1993) have been found. The research made in Lódź agglomeration showed the presence of 30 fungi species in oral cavity. Among them yeasts dominated they consisted of *C. albicans* (70 %), *Geotrichum candidum* (11 %) and *C. tropicalis* (8 %). Earlier observations made in Olsztyn province (Dynowska, 1990) confirmed often occurring *C. albicans* in oral cavity.

Comparing Kurnatowska's (1978), Davies's (1982), Kowszyk-Gindifer and Sobiczewski's (1986), Merle's (1986) and Zaremba's (1990) research with actual results of my research – we may say that occurring *Geotrichum candidum* and *Trichosporon* species is rather rare. Drutz (1986) draws attention to danger of respiratory system's infections by *Trichosporon beigelli* (= *T. cutaneum*), *T. capitatum*, *T. pullulans* and *T. fermentans*. According to the author those species are widely spread and are often elements of mycoflora of skin – – where from they may reach to oral cavity or nose and penetrate respiratory system. To rare fungi we may count *Debaryomyces hanseni*, *Saccharomycopsis capsularis* and *Pichia* spp. Smaller occurrence of such species as *Candida* (*P. membranaefaciens*, *P. guiliermondii* and *C. parapsilosis*) has been observed. During two last years fungi of *Trichosporon* genus were being isolated and *C. albicans* less often. Barnett, Payne and Yarrow (1990) think two last mentioned above fungi as the form of one species – *C. albicans*. But the research of Dynowska and Giełwanowska (1992) showed their different morphology and physiology. It is admitted to remain of this same status in spite of conclusions of authors – mentioned above. The more so as laboratory diagnostics is based on traditional fission.

Fungi are the organisms very plastic and effusive-owing to huge enzymatic activity. They adopt themselves quickly to still changing conditions – including those which are caused by man's internal organs (Dudkiewicz, Jabłoński, 1989; Kowszyk-Gindifer, Sobiczewski, 1989). Such biotope is often suitable for fungi existing in respiratory system. The most common disease – caused by yeasts – in candidosis, with belonging to it bronchical pulmonary form. And this is why doing research work on composition and physiology of mycoflora of respiratory system is important and advisable. The results of those research show very clearly the changeable character of mycoflora having being researched. The number of isolated species and their growth is bigger. It is possible that it should be associated with using new chemotherapeutics and still getting worse conditions of natural biotope.

It is more and more difficult to say which fungi may occur only on skin, only in oral cavity or only in sexual system. The limbs between each ecological classes of pathogenic fungi are getting more and more fluent – hainly because of their variability and possibility of adaptation.

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