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### **Status indicators of the mucosal epithelial cells of the lips and cheeks in older people, lived big city and village**

The biological age of the person can be defined by a simple and effective method which is called as calculation of a tsitogramma of a mucous membrane of bodies of an oral cavity. By means of this method indexes are counted: differentiations epithelialnykh of cages and orogoveniye.

This analysis showed that aged people of 45-64 years have a value of average sizes of these indexes at the people living in the city and the village from each other especially don't differ. However, since 65 years, the level of a differentiation and orogoveniye at residents and the village considerably differ. The maximum value of these indexes comes to light at respondents at the age of 75-80 years. The data obtained by us will be agreed with data of other researchers [12]. Reactivity change the mukozonalnykh of epitheliotsit at residents of the big city is expressed better, than at respondents from rural areas. It probably is connected with an ecological situation and food of city dwellers

**Key words:** mucosal epithelial cells, stage of differentiation, keratinization index, the index of differentiation of epithelial cells, mucosa, lip, cheek, city, village.

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**Жасы үлкен адамдардың, үлкен қала мен ауылда тұратын,  
ерін мен ұрттың мукозальді эпителиоциттерінің көрсеткіштері**

Адамның биологиялық жасын қарапайым және тиімді әдістердің көмегімен анықтауға болады, бұл әдіс ауыз қуысының кілегейлі қабығының цитограммасы деп аталады. Бұл әдістің көмегімен келесі индекстер саналады: мүйізделу үрдісі мен эпителиальды жасушалардың дифференциациясы.

Жоғарыдағы сараптама нәтижесінен 45-64 жастағы адамдардың ауыл мен қала тұрғындарының индекстерінің көрсеткіштерінде айтарлықтай айырмашылықтар байқалмаған, бірақ 65 жастан кейін оның өзгерістері анық. Бұл айырмашылықтардың жоғарғы шегін 75-80 жастан кейін байқауға болады екен.

Біздің анықтаған нәтижелеріміздің көрсеткіші басқа зерттеулердің нәтижелерімен сәйкес келіп отыр [12]. Алып қалалардағы тұрғындарының мукозональды эпителиоциттерінің реактивті көрсеткіштері ауыл тұрғындарының көрсеткіштерінен әлдеқайда жоғары екенін біздің жасаған сараптамалар айқын дәлелдеп отыр, біз мұны экологиялық ахуал мен қатар әлеуметтік деңгеймен салыстырамыз.

**Түйін сөздері:** мукозональді эпителиоциттер, дифференцировка сатылары, мүйізді индексі, эпителиальды жасушалар дифференцировкасының индексі, кілегейлі қабығы, ерін, ұрт, үлкен қала, ауыл.

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**Показатели состояния мукозональных эпителиоцитов губы и щеки  
у людей старшего возраста, проживающих в большом городе и селе**

Биологический возраст человека можно определить с помощью простого и эффективного метода, который называется подсчетом цитогаммы слизистой оболочки органов полости рта. С помощью этого метода подсчитываются индексы: дифференцировки эпителиальных клеток и ороговения.

Данный анализ показал, что у людей в возрасте 45-64 лет значение средних величин данных индексов у людей, живущих в городе и селе, друг от друга особо не отличаются. Однако, начиная с

65 лет, уровень дифференцировки и ороговения у жителей города и села значительно отличаются. Максимальное значение этих индексов выявляется у респондентов в возрасте 75-80 лет. Полученные нами данные согласуются с данными других исследователей [12]. Изменение реактивности мукозональных эпителиоцитов у жителей большого города выражено лучше, чем у респондентов из сельской местности. Это, вероятно, связано с экологической обстановкой и питанием городских жителей.

**Ключевые слова:** мукозональные эпителиоциты, стадии дифференцировки, индекс ороговения, индекс дифференцировки эпителиальных клеток, слизистая оболочка, губа, щека, большой город, село.

The end of XX – beginning of XXI centuries is characterized the global aging of population of the planet. International Association of Gerontology stated the fact that «the age of young people turns into the age the elderly» [1, 2, 3]. It is worth mentioning that currently elder population of Kazakhstan makes more than 7.7%. UN experts refer Kazakhstan to the states with accelerated aging and expect that the number of elder persons may be increased up to 11% [4]. This demographic change currently prioritizes gerontological field of the medical science. According to modern concepts, physiologic aging represents itself inevitably occurring natural destructive process associated with weakening of the body functions at all levels, starting from the molecular [5].

It is well known that each patient from the older age groups suffer from significant number of various diseases. It is worth mentioning that the bulk of population of the Republic of Kazakhstan lives in rural areas – in conditions, often bordering the extreme ones. Therefore, this group of population is especially needs well timed and widely-scale implementation of preventive measures, as well as the search of modern and non-invasive objective methods for detecting the signs of aging. Oral mucosa (MMOC) is one of the major body systems. It performs the barrier function against the action of pathogenic biological, physical and chemical factors, being susceptible to age-related changes as well as all other tissues of human body [6, 7]. Epithelial cells in oral mucosa cause special interest. Epithelium is capable of changing its functional status under the influence of exogenous and endogenous stimuli. This allows using it for studying physiology and reactivity of mucous membranes, including an indicator of local and systemic homeostasis disorders [8]. However, reactivity of oral mucosa epithelium in elderly and senile people living in metropolis, and in rural areas has been studied insufficiently. Objective: to determine the level of differentiation and degree of keratinization of the lips and cheeks mucosal epithelium among respondents of elderly and senile

age living in a big city and in rural area.

### Materials and Methods

The present scientific research provided the study of smears taken from mucous membranes of lips and cheeks from 80 respondents from Almaty district of Almaty and 80 respondents from Kegen village of Almaty region aged from 45 to 80 years. This selection of material excluded respondents with «local» and «systemic» inflammatory diseases, viral and endocrine diseases. All indicators were analyzed in 8 groups: 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, elder than 80 years. Collection of samples was held in the morning hours on an empty stomach. Material from mucous membranes was taken using sterile metal spatula and used for preparation of smears. Smears were dried, fixed in acetone-alcohol (1:1) for 5 minutes and stained by methods of May-Grunwald and Romanowsky-Giemsa [9]. *The study of smears included the count of 1000 (one thousand) cells, including epithelial cells of six differentiation stages. Data obtained from cytograms has been used for calculation of the following indexes: Epithelial cells differentiation index (IDIF) and Epithelial cells keratinization index (IK)* [10, 11]. Analysis of data and assessment of statistical significance were performed by using secondary Student's t test using professional statistical software package StatSoft (USA) «Statistica – 6». Changes in indicators were considered significant at  $P < 0.05$ .

### Results and discussion

Results of the present scientific research have shown that epithelial cells of the fourth and fifth stages of differentiation frequently occurred in mucous membranes of lips and cheeks in all groups. Buccal epithelium differentiation index values have reached  $445.2 \pm 4.05$  conv. u. among residents of Almaty and  $442.52 \pm 2.27$  conv. u. among inhabitants of Kegen village at the age of 45 to 64 years. Values of *differentiation index (IDIF) were significantly*

increased at the age of 65 years and reached the following figures: up to  $466,1 \pm 5,0$  conv. u. among residents of Almaty and  $449,7 \pm 2,48$  among inhabitants of Kegen, correspondingly. This indicator reached the following values: up to  $470,0 \pm 5,2$  among residents of Almaty and up to  $460 \pm 3,71$  conv. u. among inhabitants of Kegen at the age of 80 years. As a result of such changes differentiation index level among city residents at the age of 65 years was significantly higher ( $P < 0.05$ ) than at those living in the village (Figure 1). *Epithelial cells keratinization index's dynamics was also similar among residents*

of the city and village in corresponding age groups (Figure 2). Average keratinization index values among 45 years old residents of the city and village were not significantly different and made:  $2,7 \pm 0,3$  conventional units and  $2,2 \pm 0,68$  conv. u., accordingly. It is worth mentioning that keratinization index values among city residents were higher comparatively to inhabitants of Kegen ( $5,4 \pm 0,7$  and  $3,2 \pm 0,9$ , respectively;  $P < 0.01$ ) at the age of 65 years. Buccal epithelium keratinization index value has increased up to  $7,0 \pm 0,7$  conv. u. among city residents and up to  $4,2 \pm 0,5$  conv. u. ( $P < 0.01$ )

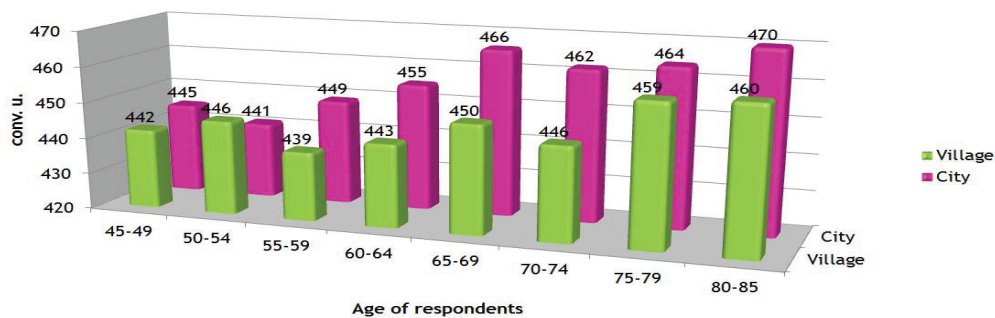


Figure 1 – Buccal epithelium differentiation index values among respondents of elderly and senile age

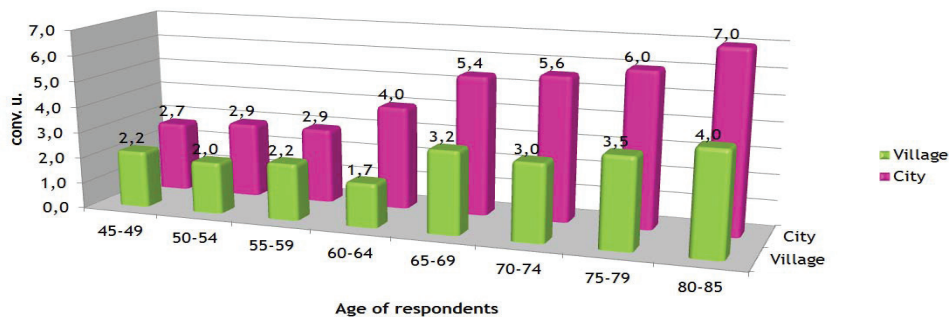


Figure 2 – Buccal epithelium keratinization index values among respondents of elderly and senile age

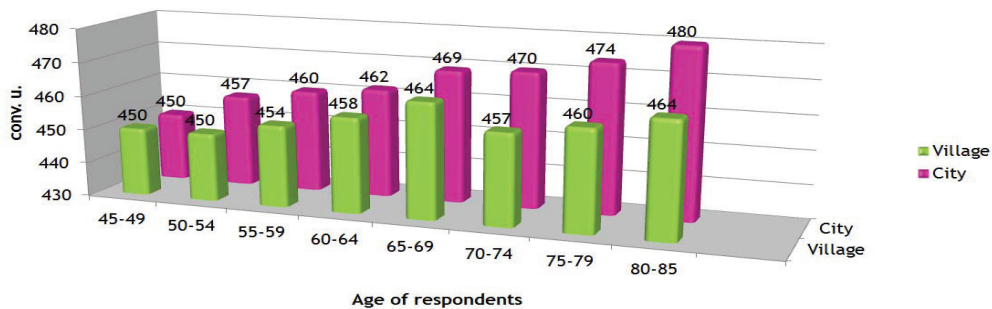
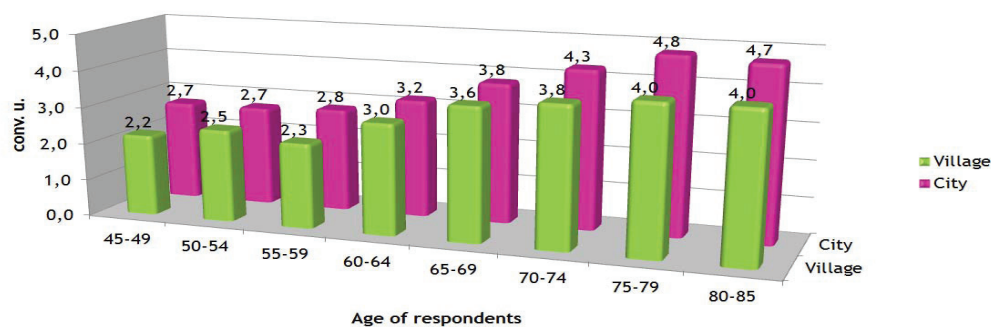


Figure 3 – Labial mucous membrane's epithelial cells differentiation index values among respondents of elderly and senile age



**Figure 4** – Labial mucous membrane’s epithelial cells keratinization index values among respondents of elderly and senile age

among village inhabitants at the age of 80 years.

Lips epithelium differentiation index values have reached  $450,2 \pm 5,95$  conv. u. among residents of Almaty and  $450,3 \pm 5,9$  conv. u. among inhabitants of Kegen at the age of 45 to 64 years. Values of differentiation index (IDIF) were significantly increased at the age of 65 years and reached the following figures: up to  $468,8 \pm 5,4$  conv. u., among residents of Almaty and  $464,2 \pm 6,8$  conv. u. ( $P < 0.05$ ) among inhabitants of Kegen, correspondingly. This indicator reached the following values: up to  $480,0 \pm 7,1$ , among residents of Almaty and  $464,2 \pm 5,7$  conv. u., among inhabitants of Kegen at the age of 80 years. As a result of such changes the lips epithelium differentiation index level among city residents at the age of 80 years was significantly

higher than at those living in the village (Figure 3).

Dynamic of the lips epithelium keratinization index at the residents of the city and village, depending on their age is shown on Figure 4. Average values of keratinization index at the age of 45 – 64 years among city residents have made  $2,7 \pm 0,3$  conv. u., and  $2,0 \pm 0,68$  conv. u. among village inhabitants. Values of keratinization index significantly increased at the age of 65 years and reached the following figures: up to  $3,8 \pm 0,5$  among residents of Almaty and up to  $3,6 \pm 0,4$  among inhabitants of Kegen, correspondingly ( $P < 0.01$ ). This indicator reached the following values: up to  $4,7 \pm 0,8$  conv. u., among residents of Almaty and up to  $4,0 \pm 0,5$  conv. u. among inhabitants of Kegen at the age of 80 years. Keratinization index values were not significantly different

depending on the place of residence.

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