



# **HEALTH EDUCATION RESEARCH**



# Health Education Research

Issue 6 (2), December 2017

VOLUME 32

Oxford University Press

2017

*Health Education Research, Issue 6 (2), (December), Volume 32. Oxford University Press, 2017. - Pages 1350 – 1668.*

Proceedings of the Journal are located in the **Databases Scopus and Web of Science.**

Source Normalized Impact per Paper (SNIP): 0.988

SCImago Journal Rank (SJR): 0.814

**Impact factor: 1.667**

**5-Yr impact factor: 2.456**

© 2016 Thomson Reuters, 2015 Journal Citation Report®

**EDITORS:**

**FOUNDING EDITOR**

**D S Leather**

**EDITOR-IN-CHIEF**

**Michael Eriksen**

*USA*

**ASSOCIATE EDITORS**

**P Aggleton**

*Australia*

**J O'Dea**

*Australia*

**A Ramirez**

*USA*

**EDITORIAL BOARD**

**J Allegrante**

*USA*

**O Al-Khatib**

*Egypt*

**T Baranowski**

*USA*

**V Barnekow Rasmussen**

*Denmark*

**J M Bernhardt**

*USA*

**W Brieger**

*USA*

**J K Davies**

*UK*

**S Chan**

*China*

**M Chopra**

*South Africa*

**J B Connelly**

*UK*

**M Denscombe**

*UK*

**S B Fawcett**

*USA*

**J Forster**

*USA*

**A C Gielen**

*USA*

**R Goodman**

*USA*

**J Green**

*UK*

L Green  
USA  
**P C Gupta**  
*India*  
**N Harre**  
*New Zealand*  
**N Hwalla**  
*Lebanon*  
**P Hawe**  
*Australia*  
**S Hegazi**  
*Egypt*  
**N Henley**  
*Australia*  
**B B Jensen**  
*Denmark*  
**M-C Lamarre**  
**S Latter**  
UK  
**L Lechner**  
*The Netherlands*  
**V Lin**  
*Australia*  
**L C Mâsse**  
*Canada*  
**J Meyrick**  
UK  
**K R McLeroy**  
USA  
**M B Mittelmark**  
*Norway*  
**S P Reddy**  
*South Africa*  
**A Rigby**  
UK  
**C Roberts**  
UK  
**M Sparks**  
*Australia*  
**A B Steckler**  
USA  
**S Tilford**  
UK  
**C Tudor-Smith**  
UK  
**M Yap**  
*Singapore*  
**M Yildirim**  
*Turkey*  
**M S Zeedyk**  
UK  
**M Zimmerman**  
*Michigan*

**EDITORIAL ASSISTANT**

**T Hoang**  
USA

ISSN 0268-1153  
EISSN 1465-3648

© Oxford University Press, 2017  
© The University of Oxford, 2017

## CONTENTS

<i>Le Nhu Nguyet Dang, Thi Le Binh Doan, Thi Kim Anh Pham, Thi Hong Phan, Mong Hiep Tran Thi, Francoise Janssen, Annie Roberts</i> <b>Urinary Abnormalities in Asymptomatic Children of Ho Chi Minh City: A Population-Based Study.....</b>	<b>1357</b>
<i>Gauri Billa, Karan Thakkar</i> <b>A Case of Chronic Cough with Progressive Breathlessness in a 32 Year-old Male Health Worker - Tuberculosis?, Allergic Bronchitis?, Asthma?.....</b>	<b>1370</b>
<i>Hamid Soori, Ali Nasermodadi, Elaheh Ainy</i> <b>The Role of Graduated Drivers' Licensing on Incidence and Severity of Road Traffic Injuries in Iran.....</b>	<b>1377</b>
<i>Toru Goyagi, Yoshitsugu Tobe</i> <b>Dexmedetomidine Ameliorates Histological and Neurological Outcomes after Transient Spinal Ischemia in Rats.....</b>	<b>1387</b>
<i>Raywat Deonandan, Samantha DiRaimo</i> <b>Demographic Profile of Travellers Seeking Reproductive Tourism Services.....</b>	<b>1399</b>
<i>Fahad Al-Ghimlas, Kalaivane Subbramaniam, Osama Al-Owaish, Ma. Theresa Bilas, Kazem Behbehani</i> <b>The Effects of Supervised Exercise Program on Health-Related Physical Fitness in Kuwait.....</b>	<b>1408</b>
<i>Abubakir M. Saleh, Namir G. Al-Tawil, Tariq S. Al-Hadithi</i> <b>Didactic Lectures and Interactive Sessions in Small Groups: A Comparative Study among Undergraduate Students in Hawler College of Medicine.....</b>	<b>1427</b>
<i>Yuriy Krikukha, Inessa Gorskaya, Anatoliy Fomenko</i> <b>Physical readiness of skilled Greco-Roman style wrestlers-juniors of different weight categories.....</b>	<b>1439</b>
<i>A.A. Aliyev</i> <b>Research of the effect of road transport degree of pollution on people's health (on the example of main road M-1).....</b>	<b>1447</b>
<i>Venelin Terziev, Ekaterina Arabska</i> <b>Social entrepreneurship in Bulgaria and Europe.....</b>	<b>1458</b>
<i>Vitalii Ghicavii</i> <b>Comparative Outcomes Assessment for Bipolar Plasma Vaporization and Monopolar Transurethral Resection in Benign Prostatic Hyperplasia.....</b>	<b>1471</b>
<i>Volodymyr Hryn, Oleg Sherstjuk, Nataliya Svintsytska, Andrey Piljugin</i> <b>Morphofunctional characteristic of the appendix of newborns and infants.....</b>	<b>1481</b>
<i>Vanina Mihaylova, Dimitar Shopov, Iliya Bivolarski, Adolf Alakidi</i> <b>Current conceptual approaches for assessment of the process of ageing and old age.....</b>	<b>1488</b>
<i>Dimitar Shopov, Borianca Veselinova, Vanina Mihaylova, Teodora Stoeva</i> <b>Factors of the high death rate from breast cancer.....</b>	<b>1499</b>

**Volodymyr Hryn,**

*Higher State Educational Establishment of Ukraine*

*“Ukrainian Medical Stomatological Academy”,*

*Associated Professor at the Department of Human Anatomy,*

*Ph.D in Medicine,*

**Oleg Sherstjuk,**

*Higher State Educational Establishment of Ukraine*

*“Ukrainian Medical Stomatological Academy”,*

*Head at the Department of Human Anatomy,*

*Doctor of Medical Sciences, Professor,*

**Nataliya Svintsytska,**

*Higher State Educational Establishment of Ukraine*

*“Ukrainian Medical Stomatological Academy”,*

*Associated Professor at the Department of Human Anatomy,*

*Ph.D. in Medicine,*

**Andrey Piljugin,**

*Higher State Educational Establishment of Ukraine*

*“Ukrainian Medical Stomatological Academy”,*

*Associated Professor at the Department of Human Anatomy,*

*Ph.D. in Medicine*

## ***Morphofunctional characteristic of the appendix of newborns and infants***

**Abstract:** This article is devoted to the study of morphological characteristics of the appendix of newborns and infant. The publication focuses on the lymphoid nodules, crypt, size and function of the appendix.

**Keywords:** Newborn, infant, the immune system, appendix, lymphoid nodule.

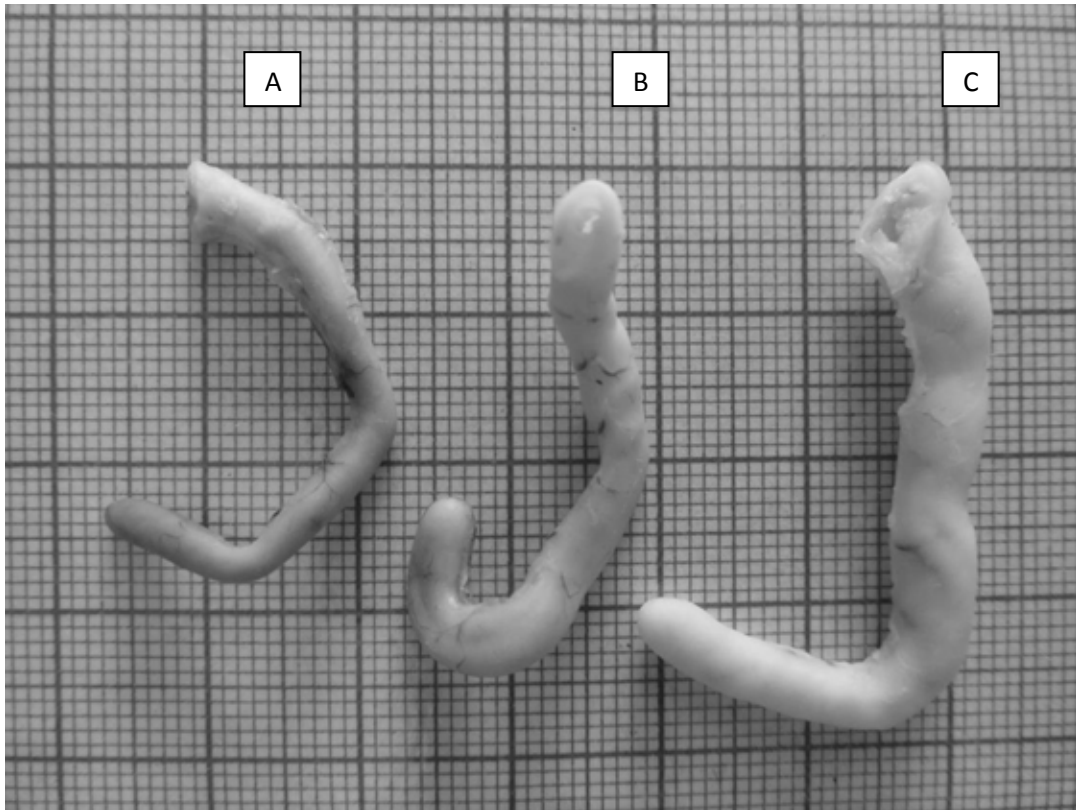
**Introduction:** Appendix as an integral part of the cecum is a lymphoepithelial organ of the peripheral immune system, which belongs to the mucosa of the digestive tract. According to the literature the development of appendix at the early

stages of postnatal period is usually presented too superficially to estimate the true morphological picture of the gaining definitive properties that are mainly in the formation of his mucosa full lymphoepithelial complex as a single or group of lymph nodes that appear in literature as "Peyer's Patches" [1, 2, 3, 4, 5].

Therefore, the purpose of this research is to study the morphological structure of the human appendix in newborns and infants.

**Material and methods.** The research materials were: infant's appendix aged 1 day, separated from the ileocecal intestine, (three specimens), one specimen – day 2 and one – day 4; infants: 12, 14, 30 days, 1.5 and 3.5 months, who died from various causes unrelated to the defects of the gastrointestinal tract that were obtained at the Poltava Regional Office postmortem being registered by Bioethics Commission HSEE of Ukraine "UMSA" (minutes № 96 dated 18.09.2011).

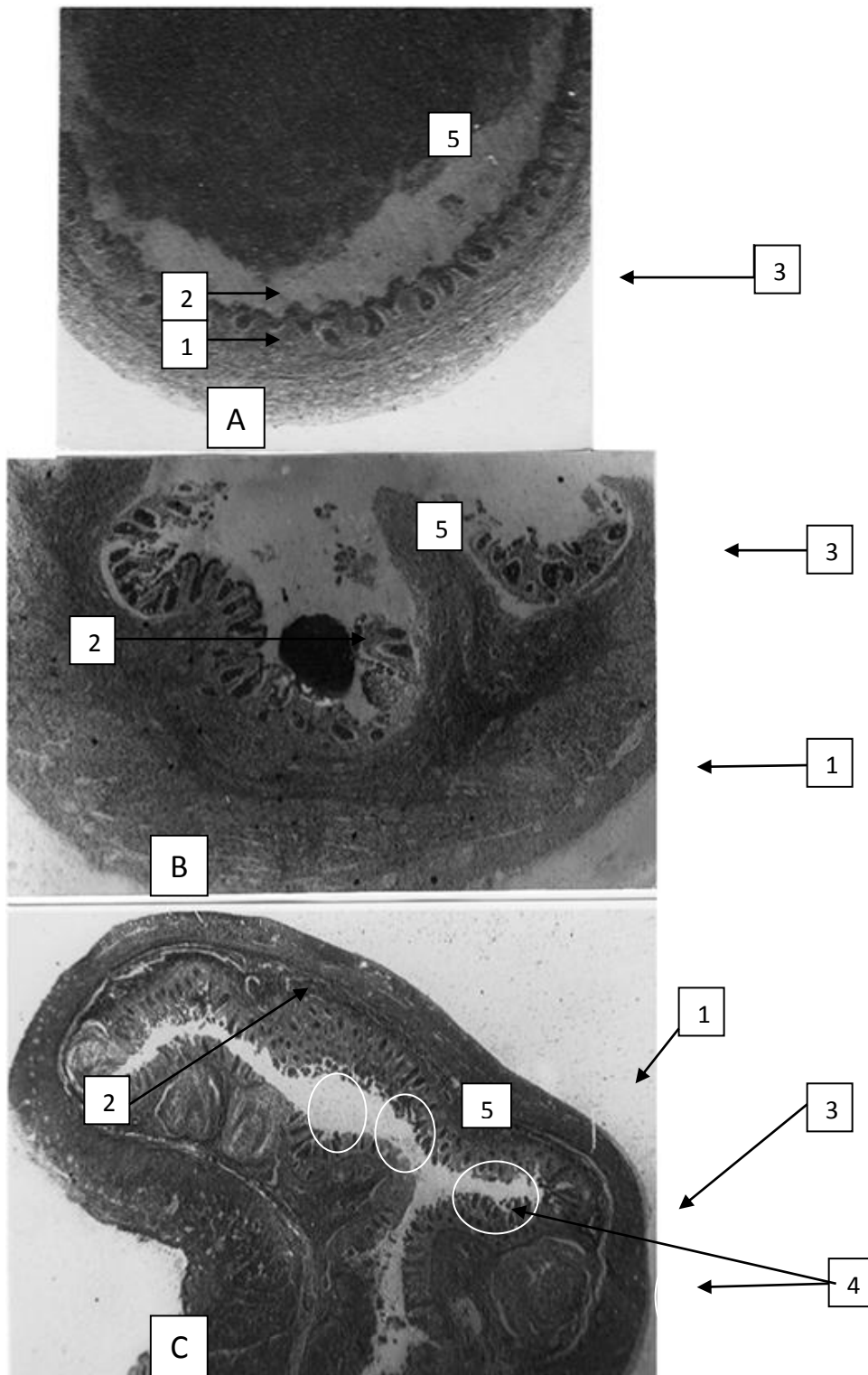
After fixing in a 10% neutral formalin solution and washing present samples were dehydrated with the increasing of spirit (ethyl) concentration and changing it to acetone. The further procedure was staged impregnation of tissues by epoxy "Epon - 812" (Epon 812, Fluka Chemie, Switzerland) according to the methods of preparation of the material for transmission electron microscopy but with a double extension of time for each stage [6]. After final overexposure in an incubator, they were placed in transparent plastic forms with clear epoxy resin, which returned to the incubator for the final polymerization. Shortly epoxy units pulled out from the plastic molds and were subjected to a preliminary examination and photographic documentation. Microscopic study of appendectomy was performed by obtaining different thickness of sections. After careful polishing frontal surfaces they were stained with 1% solution of methylene blue at 1% solution of borax and studied using binocular loupes "MBS-9" and light microscope "Konus" equipped with digital photographic attachment. **Results and discussions.** In the first two weeks after birth appendix length (approximately 40 mm) and thickness (about 5 mm) is comparable to some forms of adult (Fig. 1).



**Fig. 1. Appendix of newborn (A - 2 days), infants B - 14 days, C - 3,5-months)**

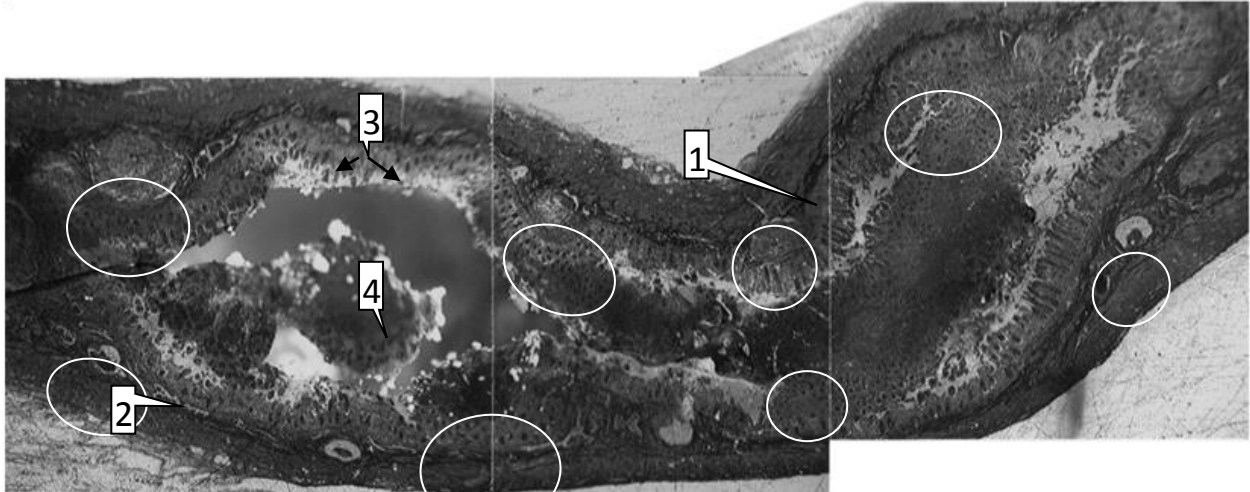
However, on histological parameters, it is still at the stage of differentiation of muscle and mucous membranes, between which is not yet scheduled (that deserves attention) forming submucosa. At this stage of postnatal life process of development of the mucosa of the appendix, the aim is to quantify the reduction of intestinal villi and rising of epithelial crypts that have not reached a definitive form yet. Besides, the mucous membrane that completely no whatsoever signs favorites lymphoid nodules. Consistent exposure of tissue preparations by grinding layers with subsequent polishing frontal surface and painting of methylene blue allowed to fix their internal structure on micrographs obtained at different magnifications optics light (Fig. 2).





**Fig. 2. Newborn's appendix (A - 2 days) and infants (B - 14 days, C - 3,5-months). Epoxy thin section. Methylene blue painting. 7x lens. 1 - muscle membrane; 2 - mucosa; 3 - crypts; 4 - lymphoid nodules; 5 - internal lumen and its contents**

But in 3.5 months after birth appendix is a well-established lymphoepithelial body because there are separately incorporated and groups of lymphoid nodules in its mucosa, all the way from the base to the top.



**Fig. 3. Appendix of 3.5 months newborn rights in longitudinal section  
Epoxy thin section. Methylene blue painting. 7x lens.**

**1 - muscle membrane; 2 - submucosa; 3 - mucosa; 4 - the contents of the inner lumen. Lymphoid nodules are marked by circles**

At this age, it's mucous membrane has a dense concentration of epithelial crypts, where there are numerous Paneth cells [7]. Proximity to the definitive form and confirms its size, which is comparable with adults [5, 8, 9, 10]. At the early stages of postnatal life the size of the appendix is far bigger than the total length of the cecum. To assess the maturity of its significant morphological features should be considered the presence of a well expressed by the loose connective tissue layer that separates the mucous membrane of the muscle.

Conclusions. According to some literature data, lymphoid nodules in the appendix are formed immediately at the first antigenic stimulation in 3-4 days after birth [1, 3, 11, 12, 13]. Taking into consideration that they represented the preparations were detected up to 14 days of newborn humans, it is possible to think that the time of their anlage varies individually. It was noted that in this age appendix is quite comparable with some of his adult forms. In the first days after birth the difference in sizes between the appendix and colon is a testament to advance the

process of formation of the immune system compared to the digestive function of the gastrointestinal tract.

Unfortunately, we couldn't get a specimen of appendix that would mark the exact time of anlage and further development of lymphoepithelial associations nodular form. The main condition for starting the formation of the latter is the entry epithelial crypts mature form when they reach the bottom parts of the muscle plate mucosa and submucosal layer of connective tissue formation. This complete composition registered in preparation appendix 3.5 months of age postnatal life. In addition, the total size of its comparability with adults indicates that it doesn't rise.

#### References:

1. Афанасьев Ю. И. Гистология: [учебник] / Ю. И. Афанасьев, Н. А. Юрина, Е. Ф. Котовский / [под ред. Ю. И. Афанасьева, Н. А. Юриной]. – 5-е изд., перераб. и доп. – М.: Медицина, 2002. – 744 с.
2. Костиленко Ю. П. Обоснование неправомерности отнесения червеобразного отростка к рудиментарным органам / Ю. П. Костиленко, В. Г. Гринь // Вісник проблем біології і медицини. – 2011. – Т.3 (89), вип. 3. – С. 6-9.
3. Рабсон А. Основы медицинской иммунологии / А. Рабсон, А. Ройт, П. Делвз. – М.: Мир, 2006. – 320 с.
4. Deshmukh S, Verde F, Johnson PT, Fishman EK, Macura KJ: Anatomical variants and pathologies of the vermiform appendix. Emerg Radiol; 2014 Oct;21(5):543-52.
5. Barlow A, Muhleman M, Gielecki J, Matusz P, Tubbs RS, Loukas M: The vermiform appendix: a review. Clin Anat; 2013 Oct;26(7):833-42.
6. Костиленко Ю. П. Метод изготовления гистологических препаратов, равноценных полутонким срезам большой обзорной поверхности, для многоцелевых морфологических исследований / Ю. П. Костиленко, И. В. Бойко, И. И. Старченко – СПб.: Морфология. – 2007. – №5. – С. 94-96.
7. Новицкий В. В. Содержание цинка в клетках панета и предстательной железы при действии хелатирующих и стрессовых факторов / В. В. Новицкий // Бюллетень экспериментальной биологии и медицины. – 2011. – № 8. – С. 140-143.

8. Searle AR, Ismail KA, Macgregor D, Hutson JM. Changes in the length and diameter of the normal appendix throughout childhood. *Journal of Pediatric Surgery*. 2013;48(7):1535–1539.
9. Paul UK, Naushaba H, Begum T, Alam J. Position of vermiform appendix: a postmortem study. *Bangladesh Journal of Anatomy*. 2009;7(1):34–36.
10. Trout AT, Towbin AJ, Zhang B: Journal club: The pediatric appendix: defining normal. *AJR Am J Roentgenol*; 2014 May;202(5):936-45.
11. Rahman MM, Khalil M, Sultana SZ, Jahan MK, Shafiquzzaman M, Parvin B, Islam MT: Histomorphometric study of lumen of human vermiform appendix. *Mymensingh Med J*; 2012 Jan;21(1):39-43.
12. Сакимбаев Э. Р. Возрастная анатомия групповых лимфатических узлов червеобразного отростка человека / Э. Р. Сакимбаев // *Архив анатомии*. – 1984. – Т. 87, № 8. – С. 60-64.
13. Сапин М. Р. Лимфатическая система и ее важнейшая роль в иммунных процессах / М.Р. Сапин, Д.Б. Никитюк. М.: Медицинская книга, 2014. 36 с.