The Role of Sex in Lung Physiology and Asthma Development Over Time

|  |
| --- |
| Micro Reviews in Cell and Molecular Biology |

Many young adults suffer from asthma and asthma related symptoms through out various stages of their life, including prepubescent stages, and late adulthood. The question of this study asks, to what extent does sex play a role in the effect and longevity of asthma related symptoms and development of the lung physiology. Amy Thomas is a medical doctor practicing in Highland Park, Illinois. She has completed both a residency in Pediatrics as well as a fellowship in allergy and immunology, enhancing her credibility in her field of research. Thomas’s studies have shown that the apparent symptoms of asthma in males and females appear most frequently at different stages in development. This is due in part to the development of components of their respiratory and pulmonary anatomy. Discovering peak activation windows in subjects of different sexes will allow for more proactive forms of treatment early on. This will hopefully only allow minimal effect on individuals through out their lives. Studies focused on male and female asthma sufferer’s development and lung physiology may open doors to more successful treatment and asthmatic suppression through out the inflicted individuals life.

**Introduction**

Asthma is a disease affecting the breathing of an individual due to hypersensitivity of the lungs resulting in spasm and inflammation of the bronchi, usually induced by allergic reaction, physical activity or other stimulation. Asthma affects individuals at different intensities, from minor discomfort, to severe and even fatal asthma attacks. According to the CDC, nearly 8% of US adults are asthma sufferers and nearly 9.3% of children in the United States are currently diagnosed. It is also estimated that approximately 14 million individuals, to date have been diagnosed with asthma by a physician [1]. The sex of someone diagnosed with asthma is known to have some effect on the intensity and occurrence of asthmatic symptoms in childhood and later in life [2].

**Recent Progress**

Thomas’s research states that there is previously discovered knowledge indicating there is noticeable difference in the rate of development of the lungs in the fetal stage. Females generally have lungs maturing at faster rates than males. It is also known that the development of the large airway in fetuses develops earlier on in females than males [2].

The study attempted to determine the role of sex in lung and pulmonary output. Various tests on both males and females at different ages were performed. Subjects who met specific criteria to validate their diagnosis of asthma underwent a variety of tests including spirometry measurements, fractional exhaled nitric oxide measurements, manitol bronchoprovocation, and magnetic resonance measuring [2]. All of the testing formats gave researchers a view of specific internal lung function. They were also able to gain internal views of the pulmonary system as a whole. Other methods gave researchers sensitive metrics to analyze. Data collected after the study revealed that observed males possessed narrower airways in comparison to their total lung volume. It was also concluded that confirmed asthma sufferers possessed inferior rates of postbronchiodilation, In that their ways took longer to recover from constriction, Seemingly regardless of age or sex [2].

3He MRI examination revealed that males and females with asthma showed a less efficient amount of gas diffusion while breathing, as well as an increase in ventilation deficit. Interestingly, It was also revealed that females showed both lower gas diffusion measurements, and increased ventilation deficits than boys tested at the same age [2]. This indicates a link to gender in airway development and operation. This also leads to the assumption that females have a higher rate of functional decrease in respiration later in life than boys of the same age [2].

In general current research indicates there is a notable relationship between gender and lung function in both males and females, regardless of asthmatic diagnosis. For males it seems that onset hypersensitivity to common asthma, and other breathing related conditions such as allergies, physical activity, temperature and other triggers is most prevalent at prepubescent stages. Females at the same age generally to seem to suffer less from the same conditions than their male counterparts at this age window. However, females seem to have more intense onset later in life, or post pubescent stages [2].

This concludes that gender and age have definite roles in the development and function of lung physiology in both asthmatic and non-asthmatic subjects. Differences in fetal development of lung and pulmonary physiology do not directly indicate asthma risk later in life. However, it is becoming more apparent as to why certain individuals under similar diagnosis may suffer from different problems related to their condition at different, or even reverse stages of life. Future research aims to map out physiological development in a more refined manner.

**Discussion**

This study seems to carefully and intricately examine the impact of gender in lung and respiration function and development through a large span of life. The findings indicating that there is in fact a correlation in sex and this bodily development open many windows in treatment of conditions affecting breathing, such as asthma. Asthma currently stands as a condition that has no confirmed cure but rather requires treatment for most of the individual’s life. Recent research like this give a more defined idea of the physiological factors taking place at given times. This allows for more individualized and specific treatment plans that may be more effective over all. Now that it is known that there are also age related stages to many breathing conditions, this can also be taken into consideration when developing treatment plans. MRI imaging has also allowed for a more detailed view of interior lung function allowing for regionalized study of those suffering from assorted respiratory conditions. This would intern lead to more efficient treatment as well. Despite the revelation of current research several questions remain and will possibly be addressed in the near future. Determining what physiological developmental markers may signal high risk for respiratory conditions will allow for proactive intervention in early development. This could potentially lead to elimination of conditions all together later in life.

Secondly, determining why it seems male and female subjects suffer from these conditions at different stages will be greatly useful in proactive treatment, post development. Refining the exact physiological differences at different stages, and what effect they have on asthma sufferers or those suffering from related conditions, could also be very useful in treatment, as there is currently no cure for many of these conditions. A more concrete understanding on the role of gender in the development and over all function and maintenance of the pulmonary and respiratory systems in humans can be pivotal in the treatment of conditions inflicting these systems.

**Reference**

[1] "Asthma." *Centers for Disease Control and*

*Prevention*. Centers for Disease Control and Prevention, 14 May 2015. Web. 26 Feb. 2016.

[2] Thomas, Amy O., Daniel J. Jackson,

Michael D. Evans, Victoria

Rajamanickam, Ronald E. Gangnon, Sean B. Fain, Ronald L. Sorkness, Adesua Y. Okupa, Alex Thomas, James E. Gern, and Robert F. Lemanske. "Sex-related Differences in Pulmonary Physiologic Outcome Measures in a High-risk Birth Cohort." *Journal of Allergy and Clinical Immunology* 136.2 (2015): 282-87. Web.