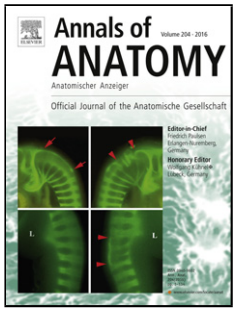

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Diaphragm: a vital respiratory muscle in mammals

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Abstract

The diaphragm is a respiratory muscle that is primarily responsible for the respiratory function in normal individuals. In mammals, the diaphragm muscle has been studied from the early days of zoology, comparative and experimental anatomy, physiology, medicine, physics, and philosophy. However, even with these early advances in knowledge pertaining to the diaphragm, comprehensive morphological data on the diaphragm are still incomplete. In this review, we summarize the beginnings of the morphological description of the diaphragm, and we describe the current status of the known morphological and embryological features. In addition, we correlate how the impairment of the diaphragm muscle in Duchenne Muscular Dystrophy (DMD) can lead to patient deaths. DMD is the most common X-linked muscle degenerative disease and is caused by a lack of dystrophin protein. Dystrophin is an important muscle protein that links the cellular cytoskeleton with the extracellular matrix. In the absence of dystrophin, the muscle becomes susceptible to damage during muscle contraction. This review allows researchers to obtain an overview of the diaphragm, transcending the morphological data from animals described in conventional literature.

Key words: history, mammalian diaphragm, muscular dystrophies, respiratory muscle

1. Introduction

The diaphragm is a respiratory muscle required for breathing and primarily responsible for respiratory function in normal individuals, corresponding to 70% of the total function and 40% of the tidal volume at rest (Unal et al., 2000; Dos Santos Yamaguti et al., 2008 and Huang et al., 2011). In addition to other respiratory muscles, its contraction during the respiratory cycle changes the anatomical configuration of the chest and moves its components by causing gas exchange in the lungs (Roussos and Macklem, 1982; Rochester, 1985 and Huang et al., 2011). The respiratory function of the diaphragm muscle expands the lungs and pleural cavity, thereby balancing the difference between abdominal and pleural pressure, which results in thoracic expansion