

**Types of Muscle Fibres**

The table below summarizes characteristics of slow-twitch (ST) and fast-twitch (FT) muscle fibres. Use this information to answer the questions that follow.

<b>ST - Slow-twitch – Red muscle (slow oxidative) -Type I fibres</b>	<b>FTa – Fast-twitch – Red muscle (fast oxidative) - Type II A fibres</b>	<b>FTb – Fast-twitch – White muscle (fast glycolytic) – Type II B fibres</b>
<ul style="list-style-type: none"> <li>• large amount of myoglobin (O<sub>2</sub> storage)</li> </ul>	<ul style="list-style-type: none"> <li>• very large amount of myoglobin (O<sub>2</sub> storage)</li> </ul>	<ul style="list-style-type: none"> <li>• low amount of myoglobin (little O<sub>2</sub> storage)</li> </ul>
<ul style="list-style-type: none"> <li>• many mitochondria</li> </ul>	<ul style="list-style-type: none"> <li>• very many mitochondria</li> </ul>	<ul style="list-style-type: none"> <li>• few mitochondria</li> </ul>
<ul style="list-style-type: none"> <li>• highly vascularized</li> </ul>	<ul style="list-style-type: none"> <li>• very highly vascularized</li> </ul>	<ul style="list-style-type: none"> <li>• poorly vascularized</li> </ul>
<ul style="list-style-type: none"> <li>• high ATP production from aerobic respiration</li> </ul>	<ul style="list-style-type: none"> <li>• very high ATP production from aerobic respiration</li> </ul>	<ul style="list-style-type: none"> <li>• ATP production from anaerobic respiration</li> </ul>
<ul style="list-style-type: none"> <li>• ATP is split slowly – contraction velocity is slow</li> </ul>	<ul style="list-style-type: none"> <li>• ATP is split rapidly – contraction velocity is rapid</li> </ul>	<ul style="list-style-type: none"> <li>• ATP is split rapidly – contraction velocity is rapid</li> </ul>
<ul style="list-style-type: none"> <li>• resistant to fatigue</li> </ul>	<ul style="list-style-type: none"> <li>• somewhat resistant to fatigue</li> </ul>	<ul style="list-style-type: none"> <li>• fatigue easily</li> </ul>
<ul style="list-style-type: none"> <li>• frequent in postural muscles of the neck</li> </ul>	<ul style="list-style-type: none"> <li>• infrequent in humans</li> </ul>	<ul style="list-style-type: none"> <li>• frequent in arm muscles</li> </ul>
<ul style="list-style-type: none"> <li>• recruited at low levels of exercise intensity</li> </ul>	<ul style="list-style-type: none"> <li>• recruited at intermediate levels of exercise intensity</li> </ul>	<ul style="list-style-type: none"> <li>• recruited at high levels of exercise intensity</li> </ul>
	<ul style="list-style-type: none"> <li>• increase in % as a result of endurance training</li> </ul>	<ul style="list-style-type: none"> <li>• decrease in % as result of endurance training</li> </ul>
		<ul style="list-style-type: none"> <li>• increase in size and strength as a result of weight training (increase in synthesis of actin and myosin)</li> </ul>

1. Among athletes, the ability to excel as an endurance (long distance, slow speed) runner or as a sprinter (short distance, high speed) is determined genetically, through the proportion of slow tonic and fast-twitch (FTb) fibers in their muscles. A long distance runner is unlikely to excel as a sprinter regardless of athletic training. Use the information in the table to explain which fibres are more abundant in the muscle of each type of runner and how these fibres enable each type of sport.

