

Chapter 13 Excerpt

As the athletes explode out of their starting blocks, the biochemical advantage of the African American athlete should be evident, as he will, in all probability, take the lead immediately. There is some evidence that the reaction time of black athletes is generally less (or faster) than that of whites, probably because of the greater contractile speed of fast-twitch muscle fibers. The white biochemical disadvantage only grows as the race continues. It is true that, because of a greater percentage of slow-twitch fibers, his metabolic system is more efficient. He produces more energy from less glucose, but he does it less rapidly because he has a lower percentage of fast-twitch muscle fibers. So, not only did he start the race with less available fuel for an anaerobic activity like sprinting, but also during the race he produces less than his black counterpart. This is because the activity level of the glycolytic pathway—where ATP is produced anaerobically—is directly related to the percentage of fast-twitch muscle fibers in the muscle groups—such as the buttocks, quadriceps and hamstrings—involved in running and jumping.

At the halfway mark, given his advantages in stride length and efficiency, power-to-weight ratio, glucose storage, and speed of glucose conversion to ATP, the black athlete should be well ahead. But, at about this point, muscle fatigue caused by a buildup of lactic acid and a rapid depletion of ATP levels could begin to become a factor. Glycolysis, as we have already seen, is fast but inefficient. Additionally, the rapid breakdown of glycogen during glycolysis leads to a buildup of pyruvic acid and its conversion to lactic acid, which causes muscle fatigue. All of this means that the advantage in glucose conversion rate—which, literally and figuratively, fueled his blazing start—should at this stage become a serious liability for the black athlete.

Therefore, despite his advantages in glucose storage and energy conversion rate, he should be running out of fuel (because of the inefficiency of anaerobic metabolism) and he should be getting fatigued (because faster lactic acid formation is an inevitable byproduct of faster anaerobic metabolism). However, as we know, this does not usually happen. Although the black athlete's advantage is greatest at the very beginning, it is still formidable at 400 meters. This is partially because of the biomechanical factors noted earlier and partially because ATP is rapidly regenerated by the activity of creatine phosphate produced in the phosphagenic pathway. This explains the athletic importance of the significantly greater levels of activity of this pathway in athletes of West African origin.