ABSTRACT. This article presents a case study from the history of cardiology, namely, the development towards the acceptance of the coronary theory of angina pectoris. I show that the arguments which were considered decisive against the theory were not answered at the time the theory was accepted. I also point out that the experimental and practical success of the theory cannot be used to support the initial choice because, in the subsequent development, the field researchers became preoccupied with new questions and problems. In spite of this, there is a sense in which the field of angina research has progressed, but it remains a challenge to exactly characterise in what sense this is the case.

INTRODUCTION

In this article I present a case study of theory change from the history of cardiology. I have chosen this case because it illustrates an interesting pattern of theory acceptance which I think is quite prevalent in the biomedical sciences, but which has not yet received sufficient attention. Briefly, the characteristics of this pattern are:

(1) The new theory has been universally, or almost universally, accepted by the research community. It is thought by all scientists to be well supported. Although it is always possible to doubt the theory in principle, in practice it is felt that it is inconceivable that the theory should be wrong;
(2) It can be shown that, at some previous time when there was a change from controversy to consensus, decisive counterarguments to the theory were not answered;
(3) The subsequent development of the field is irrelevant for the support of the initial choice; and
(4) The initial choice has led to enormous experimental and practical success, but that success cannot be used as a support for the theory.

The first three points are essentially Kuhnian, especially as interpr-
ted by Gerald Doppelt (Doppelt 1978; 1986; 1988). This means that the emphasis is on the inability of subsequent theories to account for phenomena which previous theories could account for. What makes this case interesting is that the theory is both quite low level (which I shall show in a moment) and a major biomedical theory accepted today. The fourth point is important in this respect because it questions recent attempts to show that scientific theories are basically on the mark because of their practical success.

The case I shall discuss in some detail is that of the acceptance of the fact that ischemia (lack of blood) to the heart muscle (myocardium) causes the pain felt by patients with the disease angina pectoris. If any fact is well-established, this one is. It is the cornerstone of modern cardiology and has been used to introduce a number of apparently successful interventions. It should be possible to draw some general conclusions from an examination of how scientists came to accept this paradigmatic example of a well-established fact.

Today, the coronary, or ischemic, theory of angina pectoris is universally accepted among medical researchers and clinicians. The pain of angina pectoris is believed to be somehow caused by an imbalance between blood supply and demand as a result of narrowing of the coronary arteries, either by a fixed stenosis or by spasm. Scientists use a strongly realist language when describing these events. When asked why angina patients experience pain, they will answer that there really is a diminished blood flow through the coronary arteries – either as a result of a real atherosclerotic lesion, which can be observed through a microscope, or a spasm, which, sometimes at least, can be directly observed by arteriography – which causes the pain. This fact is the basis for all work done today in angina pectoris research and has been used to introduce apparently spectacularly effective treatments, such as coronary artery by-pass surgery, and new drugs, such as calcium antagonists and beta-blockers.

As indicated in my introduction, I shall first show that one cannot maintain that this particular fact was chosen because it was the best explanation for available observations; rather, it was only after the fact had been accepted that the evidence in its favour appeared convincing. Then, I shall show that the spectacular success of the coronary theory during the last fifty years is simply not relevant for a decision regarding whether or not the pain is really caused by lack of blood to the myocardium during angina attacks. From these two observations I