

## C-Reactive Protein, Metabolic Syndrome and Cardiovascular Disease

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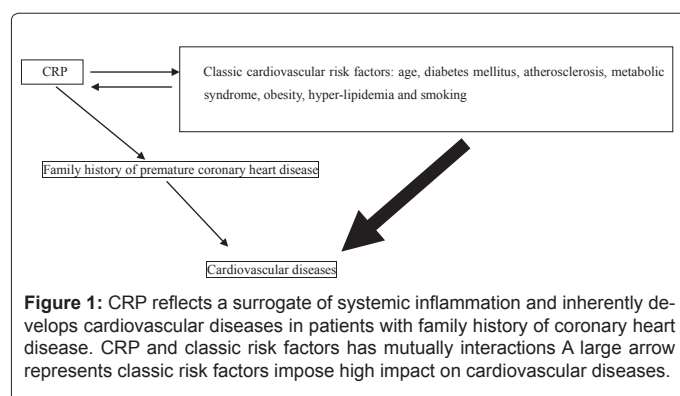
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### Editorial comment

C-reactive protein (CRP) has been known to be highly associated with the occurrence of cardiovascular disease. However controversies were present among some clinical trials with regard to the role of CRP to be the cause or a bystander in cardiovascular disease [1-3]. Experimentally, CRP was found to cause vascular endothelial dysfunction, increase matrix metalloproteinase synthesis and impair fibrinolytic capacity, which involve the process of atherosclerosis resulting in an increased cardiovascular risk [4,5]. On the contrary, CRP could be produced from the inflamed adipocytes in pericardial and abdominal visceral fat tissues and it did not correlate well to the severity of vascular atherosclerosis [6]. Furthermore, CRP was related to the development of metabolic syndrome as well and it has been interpreted to be the underlying mediator [7]. As we know, there was no additive or multiplier hazardous effect of CRP to some classic risk factors for cardiovascular diseases such as hypertension, coronary calcium score, hyperlipidemia and metabolic syndrome on the basis of subgroup analyses from the JUPITER trial, the ASCOT trial and the Framingham offspring study [8-12]. Recent genetic analyses demonstrated that carriers of CRP polymorphisms with higher serum CRP levels were not associated with higher cardiovascular risk [13]. Therefore, the controversies were still unresolved regarding the role of CRP in the pathogenesis of cardiovascular diseases.

Recently, we found CRP can reclassify Framingham intermediate cardiovascular risk patients with a family history of premature coronary heart disease without metabolic syndrome into high risk ones based on the EPIC-Norfolk study and the JUPITER trial [14-16]. Accordingly, a hypothesis between CRP and cardiovascular disease could be proposed according to current knowledge (Figure 1). For the major part, the occurrence of cardiovascular diseases has multi-factorial causes including CRP and classic risk factors, which are interacted mutually. For the minor part, we emphasize the genetic role of CRP mainly in patients with a premature coronary heart disease. This model could bridge the gap between CRP and cardiovascular disease and explain the conflicting results of many clinical trials. Most important of all, a further genetic study for CRP polymorphisms may be started in those with a family history of premature coronary heart disease in the future.



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