



## The Action of Statins on Prostate Cancer: A Clinical Overview

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### Abstract:

Statins are one of the most commonly prescribed medicines and are known to lower the level of cholesterol in blood. High cholesterol can increase your risk of developing cardiovascular disease, which includes conditions such as coronary heart disease. This is achieved by the inhibition of the HMG-CoA reductase. Prostate cancer is the most common cancer in men and usually develops slowly, so there may be no signs for many years. Genetic contributions have been associated with prostate cancer. However, no single gene is responsible for prostate cancer. Moreover, there are also reports that link prostate cancer and the use of medications including statins implicated in decreasing prostate cancer risk.

**Keywords:** Prostate cancer; Cardiovascular disease; Genetics; Cholesterol

### Introduction:

Cholesterol (lipid) is an important substance found in the human body. From the whole quantity of human cholesterol, 70% is produced by the body and 30% comes from fats that are found in our diet [1]. A small quantity of the consumed fats is absorbed by the small intestine and after metabolic processing cholesterol is produced, which is transported to the liver [2,3]. Cholesterol is then combined with proteins and the resulting complexes that are formed are classified into: chylomicrons (CM), very low density (VLDL), intermediate density (IDL), low density (LDL) and high density (HDL) lipoproteins. These complexes differ in lipid density and in the protein composition [4]. After that, cholesterol is transported to the cells and is used for the structure and the function of cell membranes, for energy, for sterol hormone formation and other important functions.

Most of cholesterol in the human body is stored in to the liver for later use. The cholesterol transported from the cells to the liver, is firstly, mixed with bile fluids and then excreted to the small intestine. Then, 95% of it, is reabsorbed by the small intestine and is transported to the liver. After that, it is stored there or transported through the bloodstream to the cells, in the form of lipoproteins. The remaining 5%, is later removed with the feces.

The most important types of cholesterol are LDL and HDL cholesterol. The first type of cholesterol is characterized as "bad cholesterol", because when it is not kept in low levels, it causes atherosclerosis and cardiovascular disease. The second type of cholesterol is characterized as "good cholesterol", because it transports the LDL cholesterol in the liver, thus keeping its level to a normal level. The HDL type of cholesterol has, also, other positive effects in human body such as anti-inflammatory

properties.

Proteins that are produced by fungi, are commonly used by physicians in order to keep human LDL (low-density lipoprotein)cholesterol to a normal level [5,6]. Statins block the pathway by which cholesterol is produced, a process located in the liver. This is achieved by the inhibition of the HMG-CoA reductase (HMGCR), an enzyme that rules the cholesterol biosynthesis [7]. This increases endothelial- derived nitric oxide (NO), a factor that achieves vasodilation, platelet aggregation, vascular smooth muscle proliferation and

### Result:

In the first study, during 2004 and 2005, a population of 4680 men aged 40 years old and above, with prostate cancer and radical prostatectomy has been selected. The study guided with criteria such as exclusion of non-stage IV disease and not neoadjuvant therapy before surgery that ensured, no resulting effect on the actual procedure according to the protocol of the study. The study was focused on two different aspects of investigation with distinct significance, but both important. In the first one, with biochemical habituation was that the PSA levels were measured as an indicatory biomarker after surgery of prostate cancer. The second type was the clinical examination and observation of the patients during their follow up period from the surgery. The follow up period of the study lasted 5 years and during that period there were regular PSA measurements and checkups of the patients. From the 4860 patients, 1342 received radical prostatectomy, 1184 were included in the analysis for biochemical recurrence and from 1200 which were used for a clinical analysis, 38% used statins before and the 55% after the prostatectomy. In the end, this study concluded that statins may have no preventive properties against prostate cancer after radical prostatectomy [21].

### Conclusion:

Statins play a crucial role in many functions of the body due to their effect on cholesterol levels that participate in many biological mechanisms. The effect of statins in prostate cancer risk is yet to be clarified. In some previously reported studies, statins have been showed to be correlated with the risk or the development of prostate cancer. In contrast, other studies report no significant status. It is worth mentioning, though, that the studies reporting the positive effects of statins in prostate cancer are the large ones, with a big number of enrolled subjects and with a long time follow up. In conclusion, the impact and the effect of statins in clinical cases of prostate cancer is not well defined to date and future properly designed protocols for double blinded clinical trials have to be performed to give the definite answer to the question.