How we will treat heart disease in the future

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Heart disease kills nearly half of us

Almost half of all deaths around the globe are caused by heart disease. This is happening despite hundreds of available medications and advanced heart surgeries that are supposed to save us from this threat.

Why do so many of us still die from heart disease?

First of all, current medical care is focused on treating symptoms, not the cause of the disease. Often we think that patients who have the same symptoms are likely to suffer from the same disease and should receive similar medical interventions and treatment. However, in reality, patients diagnosed with the same heart disease respond very differently to the same medications.

Some patients may benefit from the treatment and others remain unaffected. Factors could include the cause of their disease, age, gender, lifestyle and even behavior. We know little about which medication is the best for a particular patient. Therefore, in clinical practice, doctors change drug prescriptions repeatedly until the symptoms are relieved.

We have to admit that this current understanding about heart disease origin is not sufficient to successfully treat it.

Personalized medicine is science driven

Imagine your mother being diagnosed with heart failure. What would it be worth to you if a doctor could exactly predict what medicine is best for her? What amount of dosage should be enough to treat the disease with the least amount of side effects? And what interventions are needed to avoid heart surgery and yet save her life?

We are talking about personalized medicine – a new approach to disease management.

Personalized medicine is tailored treatment for a specific person, where each particular patient is given the right amount of the right drug at the right time. In personalized medicine, treatment decisions are not based on patient observations and symptoms, but on their genetic signatures and biochemical parameters.

New advances in molecular biology allow us to discover molecular changes that cause disease development and progression. Today we can study patient’s genes and proteins in order to identify molecular patterns of a specific heart disease.

Moreover, we can use it to diagnose and classify diseases in a different way that leads to more effective
Biomarkers tell us information about disease state

I’m a PhD student at Oslo University Hospital trying to develop new treatment options for heart failure based on personalized medicine. My goal is to identify new biomarkers that could give us information about heart failure development, progression and patient’s response to the treatment.

In general, a biomarker can be any measure that can help to prevent, diagnose or treat a disease. For example, body temperature is a well-known biomarker for fever, while blood pressure and cholesterol values are biomarkers for heart disease.

But more interestingly we can develop biomarkers that can tell us what medication is the best for a particular patient and how their disease is going to progress, if they are going to suffer from a mild disease, have a high chance getting a heart attack in the future or need a heart surgery.

I’m studying thousands of heart failure patients in order to identify what they have in common and how they differ from healthy people. I use the patient’s blood, small heart biopsies taken during heart surgeries or even the old hearts of heart transplant patients. When a very sick heart failure patient receives a new heart transplant, the old heart is not thrown out, but is carefully dissected and analyzed in order to identify genes that play important role in the development of heart failure. Once we know what exactly happens in the heart cells of a patient, we will be able to treat diseases in a more efficient way.

When a person has heart failure, it’s because the heart is very weak and is not able to pump enough blood to supply the body. Consequently the heart becomes bigger and bigger, trying to compensate the force. At the same time, numerous changes occur in the cells of the heart. The heart and body start producing large amounts of certain proteins. Some genes in the cells become very active, whereas others stop functioning at all.

The good news is that we can measure a lot of these changes in the patient’s blood and use it to make better treatment decisions. Our research group is working to identify such common changes that occur in patients with cardiovascular disorders, but are not present in healthy individuals. In the future they can be turned out into simple blood tests.

Doctors could use these tests to get more information about a patient, select best medications, predict which patients are more likely to have a severe disease or get a heart attack, which patients need a heart surgery, and a lot of more useful information.

Personalized medicine is the future

I believe that personalized medicine will definitely be a major breakthrough in medicine. Medical care is slowly shifting from observation based therapies to evidence based ones. It means that we no longer diagnose patients based on their symptoms alone, but analyze their molecular patterns in order to make better treatment decisions.

The answer to the question ‘what causes diseases’ is revealing itself little by little since we are able to unravel the genetic code of a person. Biomarker discoveries will help us understand and classify diseases in a new way. This new disease classification will support the development of new medicines directly targeting the cause of the disease.

However, this new personalized medicine requires a fundamental change in our comprehension of diseases. Many traditional diagnoses and treatment guidelines may have to be revised. Yet, if achieved, this will be a
gateway to a healthier and longer life.

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