

Toward a Personalized ‘Fountain of Youth’ in Future

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For thousands of years, humans have been searching for the fountain of youth. Today, we are living an average lifespan of almost 80 years. As more and more people are becoming old, the studies of aging and age-related diseases are on the rise. Accumulated evidence indicates that it is no longer impossible to extend lifespan and/or delay aging and the onset of age-related diseases. For example, calorie restriction has been shown to increase lifespan in a wide range of organisms including monkeys [1]. Moreover, genes have been discovered to be associated with the regulation of aging, e.g., sirt1, a gene conserved across species, has been found to be an important regulator of longevity in mammals [2]. There are now even drugs that some people believe to be anti-aging, for example, resveratrol, a natural phenol originally extracted from grape skin and has shown anticancer, anti-inflammation, anti-diabetes and beneficial cardiovascular effects in rodent studies. So far the success is seen only in laboratory animals. The question remains whether these regimes and drugs are able to confer increased longevity and healthier aging in humans. And if so, will every individual benefit from them? It is well known that humans have much larger diversity and individuality in their genetic makeup compared to model organisms used in research laboratories. A miracle drug for C57BL6 mice may very well be useless for humans, or at least to some of us. Even well-developed drugs can be metabolized differently with different cytochrome P450 genes hence affecting their efficacies. The study of pharmacogenomics will help to identify personalized medicine. In this regard, will pharmacogenomics help us to learn more about personalized aging and personalized regime/drug to combat aging?

Interestingly, studies are already showing that genetic polymorphisms of the sirt1 gene are associated with aging [3], overweight [4], cholesterol metabolism and coronary artery calcification [5], and may affect diabetes risk with prenatal exposure to famine [6]. These data suggest that indeed different people may react differently to an anti-aging pharmacological intervention. There will be a lot more studies needed to answer the question fully. In order to achieve this, more research needs to be done.

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