

TRANSCOMM

THE TRANSCELL NEWSLETTER

Do you know how your heart beat is changing with your lifestyle.....? Then read this.

It seems that heart pumps 2,000 gallons of blood flowing through the 60,000 miles of blood vessels that feed our organs and tissues. Any damage to the heart or its valves can reduce that pumping action, forcing the heart to work harder just to keep up with the body's demand for blood. Poets say "The best and most beautiful things in the world cannot be seen or even touched - they must be felt with the heart". Clinicians and Scientists advice to change the brand of cooking oil periodically or stick to the use of olive oil alone to keep a healthy heart. At this juncture, I would like to take you all to think a bit ahead of your knowledge in the direction of genomics and regenerative therapy for cardiovascular diseases (CVDs).

Introduction

Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels. CVDs are usually associated with a build-up of fatty deposits inside the arteries (atherosclerosis) and an increased risk of blood clots. It is one of the most important causes of morbidity and mortality in highly developed countries majorly due to lifestyle related risk factors. Unfortunately, its burden has increased in an exponential manner over the past two decades in India due to the rapid adaptation to western lifestyle. We, in fact surpassed the western world statistics in terms of CVD burden independent of age groups. Looking at the haunting rates of CVD burden, recently government of India has ordered for subsidy policies on the unaffordable prices of stents used for heart disease management.

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Key words:

- Lifestyle
- Heart
- Cardiovascular Disease
- Genomics
- Stem Cell Therapy

How common are CVDs ? :

CVDs are the number 1 cause of death globally. In 2016, CVDs contributed to 31% of all global deaths. Of these deaths, 85% are due to heart attack and stroke.

Cardiovascular diseases contributed 28.1% of the total deaths (adult and infant) in India in 2016, compared with 15.2%, in 1990. The risk factors associated with CVDs were strongly correlative with the lifestyle of patients.

What are the risk factors? :

The most important behavioural risk factors of heart disease and stroke are unhealthy diet, physical inactivity, tobacco use and harmful use of alcohol. Cessation of tobacco use, reduction of salt in the diet, consuming fruits and vegetables, regular physical activity and avoiding harmful use of alcohol have been shown to reduce the risk of cardiovascular disease.

Are there any databases with information on risky genes related to CVDs?

Yes but very few and most of them do not update their portal properly. The standard portal is the one maintained by European Bioinformatics Institute (EMBL-EBL) with the name Gene Ontology Annotation (GOA) Database <https://www.ebi.ac.uk/GOA/CVI>.
EMBL-EBL

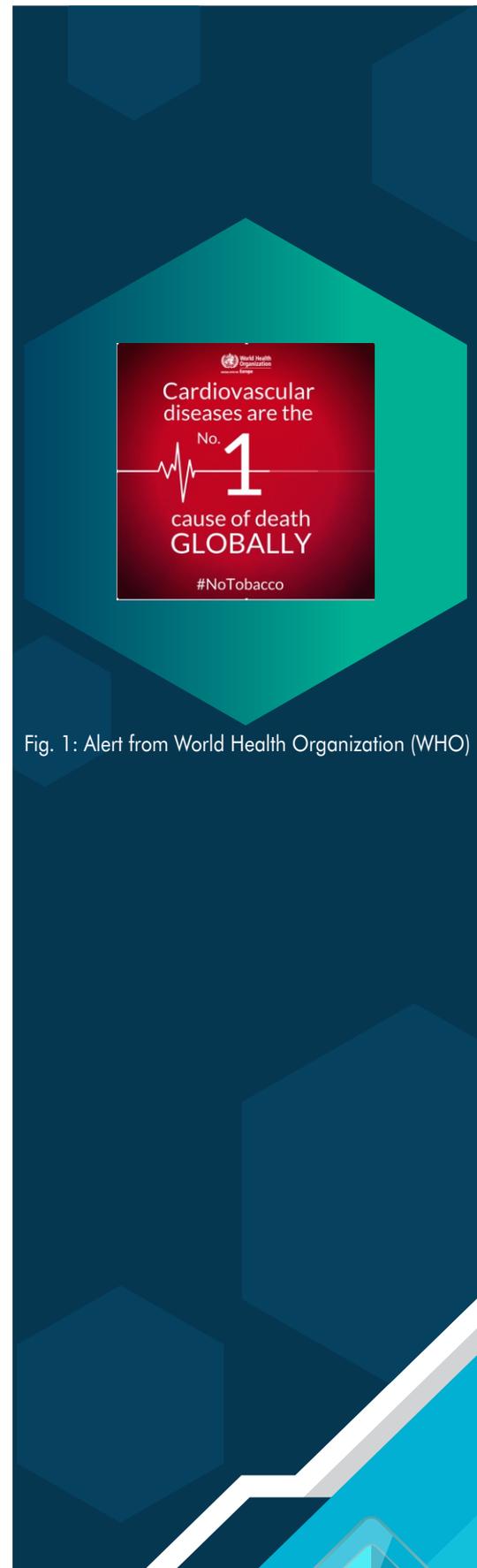


Fig. 1: Alert from World Health Organization (WHO)

maintains the world's most comprehensive range of freely available and up-to-date molecular data resources that includes huge information on CVDs. Indian Council of Medical Research (ICMR) gives cardiovascular research update at regular intervals of 3 years in their website <https://icmr.nic.in/content/cardiovascular-diseases-diabetes>.

Can genomic profiling help in early diagnosis and treatment of CVDs?

Yes, genomic profiling enables us to know the susceptibility and likely early signs of CVDs. It alerts us about the specific genetic abnormalities and the percentage risk of their inheritance to next generations of the individual. The information will be useful to take necessary steps to delay the onset of CVDs or in early diagnosis, to consider appropriate treatment options for the cases.

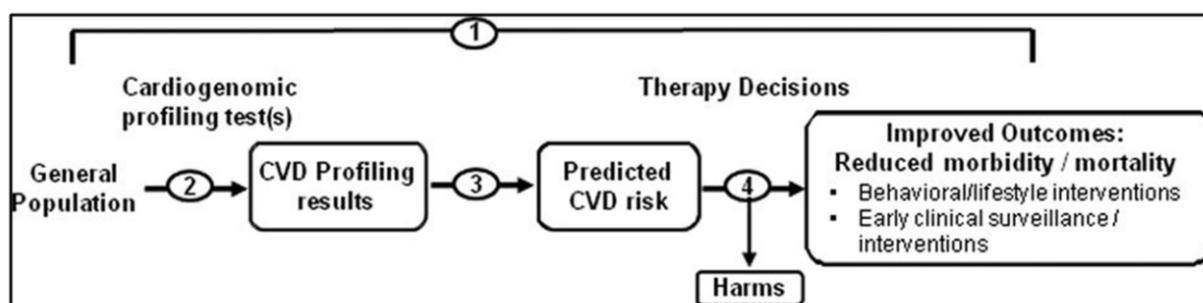


Fig 2. Schematic to show the use of genomic profiling to assess risk for cardiovascular disease.

What is the status of drug discovery?

The link <https://www.uptodate.com/contents/whats-new-in-cardiovascular-medicine> provides latest information on CVD related research and drug discovery programs. While there are multiple upcoming drugs for various symptoms of heart ailments, none of them offer complete cure. So, clinicians often bend towards transplantation, by-pass surgery and stent therapy options for long lasting results in CVDs.

Can stem cells help curing CVDs?

Stem cells have been in use to generate artificial heart and blood vessels with rapid research going on since past two decades. To combat the problems of organ shortage and decrease the chance that a patient's body will reject it, researchers have been working to create synthetic organs from patient's own cells. They are almost there but with some pitfalls that would be overcome in near future. So, it is very important for us to store our stem cells. Especially those who have the familial history of getting CVDs should invariably act

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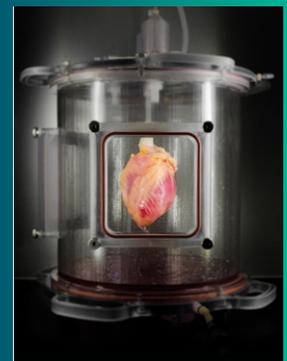


Fig 3: Heart tissue, seeded with induced cardiac cells, matures in a bioreactor that the researchers created.

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