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## Normal and cancer stem cells

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Cancers initiate and develop from rare population of stem-like cells termed as cancer stem cells (CSC). Our goal is to identify and define the single normal and cancer stem cell of every human tissue in order to succeed in cancer and stem cell therapy, organ engineering, reconstructive and cosmetic surgery. The exact phenotype of CSC and their counterparts in normal mammary gland is not well characterized. We show that CSC are predominantly CD49f + proposing the use of CD44high/CD24low in combination with Ep-CAM/CD49f cell surface markers to further enrich for CSC. Our profiling demonstrates that both normal and breast cancer cells with the CD44high/CD24low phenotype have the highest stem/progenitor cell ability when used in combination with Ep-CAM/CD49f reference markers. Our protocols help understand breast cancer, cancers heterogeneity, drug resistance, towards eradicating the roots of all cancers.

### Biography:

Chaker Adra is investigating health, disease, and pioneering the field of organ engineering and regenerative medicine. He is discovering the Laws of Physics & Chemistry as manifested in The Language of Genomes and Living Organisms. He contributed to the emergence of the field of stem cell biology & tissue engineering. He cloned, characterized the family of phosphoglycerate kinase (PGK) genes and pseudogenes. He identified the PGK-1 promoter which has proven to be a powerful and widely used promoter. He designed and constructed The PGK1-Neo Shuttle which is being used around the world for gene therapy, to engineer, from embryonic stem cells, transgenic and knockout animals to understand the causes and mechanisms of all human diseases and find cures. He cloned the pgk-2 gene, showing for the first time that gene duplication, by retroposition more than 100 million years ago, have been used as a mechanism for evolutionary diversification and that mammalian genomes are fluid creating new species. He identified chromosomal regions containing asthma and atopy susceptibility genes. He described functional polymorphisms in Interleukin-4, IL-13 and their receptors, thus making these molecules, with STAT 6, targets for therapeutic treatment of allergic patients and preventive strategies. He discovered several cancer and stem cell specific biomarkers. In a series of groundbreaking experiments, he discovered several universal gene families and biochemical and/or physiological pathways operating in bacteria, yeast, plants, animals and humans (PGK, D4GDI/RhoGDI2/ARHGDI2, RhoGDI3/ARHGDI3, RTEF-1, HTm4/CD20L/MS4A Gene Family, LAPTM5, SMARCAD1 Helicase Gene Family, and SMARCAD1, The Fingerprints Gene). Dr. Chaker Adra is a philanthropist and the inventor of 19 USA and International Patents.