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Developing personalized organoid, primary/progenitor tissue culture systems for use in precision medicines

For future use in treating life-threatening and cancerous diseases, many scientists believe that specific tissue or organ samples from individual patients themselves may have multiple and personalized, beneficiary effect on individual patients. These may include the tumor cells/ patients own immune (e.g. dendritic) cell-based cancer vaccines.

For this purpose, diagnosis, detailed definition, phenotyping of specific patient organs, treatment of individual donor patients, the “organoids” and/or primary cultures of specific tissues or their progenitor cell creatures (e.g. mammary gland organoid, liver organoid, umbelical core blood progenitor cells) are considered to be highly useful for defining specific and precision needs for donor targeted patients. These approaches may include the use of tissue-healing template cells for tenacious long term inflammatory wound diseases,

e.g. use of breast mammoplasty reduction tissue samples, colon tissues for profiling IBD (intestinal bowel disease) and IBS (irritable bowel syndrome), lupus erythematosus, and various skin diseases.

Recent and previous research findings in these areas will be briefly discussed. These include the possible use of phytochemical-activated tumor cell lysates (TCL), patient’s dendritic cells pulsed with or without TCL, as shown in mammary carcinoma / melanoma tumor cell-based cancer vaccines. Other expected usage includes the umbilical cord blood-derived CD 34⁺ progenitor cells, the comparative characterization of human breast tumor vs. normal breast tissues, and the in vivo treatment of epidermal skin tissues. The potential advantage and barriers of these technological systems will be briefly addressed.

Biography

Ning-Sun Yang is a Distinguished Research Fellow and (Distinguished) Professor of Academia Sinica and four associated universities in Taipei, Taiwan. Dr. Yang received his Ph.D. in biochemical genetics at MSU, USA. His major research interests include gene-based cancer vaccines, anti-inflammatory and anti-cancer phytochemicals, and functional genomics studies of dendritic cells. While in USA, he initiated and helped the development of gene gun technology and pioneered its application to plant genetic engineering, mammalian gene transfer, DNA vaccines and gene therapy approaches. After thirty years of a research career in USA, Dr. Yang went back to Taiwan and established the Agricultural Biotechnology Research Center in Academia Sinica, Taipei, which is now recognized for medicinal and crop plant research. He was elected in 2006 as a Fellow of the American Association for the Advancement of Science (AAAS, USA). He has published over 150 research papers and obtained 14 USA patents and 6 Taiwan’s patents.

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