

## Integrating host genetic determinants in human disease into healthcare practice: Needs focused attention.

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### Abstract

**The challenge of integrating genetic medicine into primary healthcare system has been highlighted since long. For bringing improvement in the individual as well as community healthcare practice; understanding of genetic mechanisms of disease development among healthcare providers can be considered as a limitation even today. Hence raising awareness on translational value of genetic research especially host and pathogen interaction need real focus to optimize utilization of research output in delivering healthcare downstream.**

**Keywords:** Human papiloma virus, Genetic interaction, Pathogenesis, Cervical carcinoma.

Accepted on November 06, 2017

### Introduction

Here I want to bring few examples for the researchers and practitioner's notice that will highlight wider horizon of genomic research having potential impact on therapeutics or interventions in both infectious and non-infectious illnesses. With growing population in the higher age group musculo-skeletal disorder is upcoming as a significant morbidity to the extent of crippling arthritic conditions requiring expensive replacement surgeries [1,2]. Study on identical (n=130) and non-identical (n=120) female twins aged between 48 and 70 years demonstrated for the first time a clear genetic effect for radio graphic changes in osteoarthritis independent of known environmental influences [3], which shown a lead to further work on isolating the genes associated in the pathogenesis.

Similarly host genetic studies on age related neurodegenerative conditions like Alzheimer's disease has revealed relevance of host susceptibility in disease expression. However, further evidences will be essential for application of the genetic research evidences into healthcare practice [4].

Researches could also generate some clues towards molecular mechanism of susceptibility for developing heat stroke response even if it has a very strong environmental etiology [5].

Many evidences have been generated in infectious disease pathogenesis targeting host genetic determinants and genomic variations in the pathogen or infectious agent. Widely prevalent viral infections leading to terminal morbidity like hepatitis C virus [6] and Human Papiloma virus (HPV) can be two best examples where host and pathogen genetic interaction have been explored to have a significant role.

Association of host genetic factors with HPV infection and cervical carcinoma is supported by several epidemiological studies, in recent years. Studies comparing twins and mother-daughter have explored a hereditary component of cervical tumors [7] and it has been shown that heritability of cervical carcinoma can be around twenty seven percent [8]. The

possibility of genetic predisposition is strengthened by several epidemiological evidences that reflect association of several genetic factors with cervical carcinoma. Risk of developing cervical carcinoma was shown to be highly associated with Tp53 Pro/Pro genotype while *Tp53* codon72 Argallele have a decreased association [9]. Role of different polymorphic sites of *TNF* (*TNFA-8*, *TNF-α-572,-857,-863*, *TNF G-308A*, *G-308A*) gene has been reported in several studies, though few contradict report also exist [10]. *WAF1/p21* gene polymorphism has been reported to be associated with susceptibility to cervical cancer [11] whereas other studies failed to find any association between this polymorphism and cervical cancer [12]. Squamous cell carcinoma is associated with increased expression of IL-10 [13], however, -1082G allele of IL-10 was reported to be inversely associated with HPV persistency [14]. A few studies didn't find any association of this polymorphism with cervical carcinoma [15]. These evidences have suggested the role of different genes and different molecular pathways towards the severity of manifestation or protective effect of HPV infection and cervical carcinoma, besides the defined role of HPV viral genotypes.

I hope the above examples can bring a clear note, that host genetic inheritance can play a role in susceptibility as well as outcome of infections illnesses; especially for viral pathogens that too have a wide genetic diversity in themselves. For optimizing output of genomic research in translational medicine researchers and clinicians may need to integrate their vision and direction in developing most beneficial preventive vaccines or therapeutics relevant to the host genetic profile. Likewise, genomic research in non-communicable disease expression and the possible inheritance mechanism needs to be targeted towards developing personalized medicine through popularizing medical genetics among healthcare providers and researchers in the field of basic and applied genetics. I am of optimism that the present generation researchers are quite capable to deliver the best through integrating research evidences into current health care practice.

## References

1. Emery J, Hayflick S. The challenge of integrating genetic medicine into primary care. *BMJ*. 2001;322(7293):1027-30.
2. Clement ND, Breuch SJ, Blant LC. Lower limb joint replacement in rheumatoid arthritis. *J Orthop Surg Res*. 2012;7-27.
3. Spector TD, Cicuttini F, Barker J, et al. Genetic influences on osteoarthritis in women: a twin study. *BMJ*. 1996;312(7036):940-3.
4. Tang YP, Gershon ES. Genetic studies in Alzheimer's disease. *Dialogues Clin Neurosci*. 2003;5(1):17-26.
5. Bouchama A, Konchel JP. Heat Stroke. *N Engl J Med*. 2002;346(25):1978-88.
6. Yee LJ. Host Genetic determinants in hepatitis C virus infection. *Genes Immun*. 2004;5(4):237-45.
7. Galloway DA. Papillomavirus vaccines in clinical trials. *Lancet Infect Dis*. 2003;3(8):469-75.
8. Hemminki K, Dong C, Vaittinen P. Familial risks in cervical cancer: Is there a hereditary component? *Int J Cancer*. 1999;82(6):775-81.
9. Saranath D, Khan Z, Tandle AT, et al. HPV16/18 prevalence in cervical lesions/cancers and p53 genotypes in cervical cancer patients from India. *Gynecol Oncol*. 2002;86(2):157-62.
10. Abrahamsson J, Carlsson B, Mellander L, et al. Tumor necrosis factor-alpha in malignant disease. *Am J Pediatr Hematol Oncol*. 1993;15(4):364-9.
11. Santos AM, Sousa H, Pinto D, et al. Linking TP53 codon 72 and P21 nt590 genotypes to the development of cervical and ovarian cancer. *Eur J Cancer*. 2006;42(7):958-63.
12. Chedid M, Michieli P, Lengel C, et al. A single nucleotide substitution at codon 31 (Ser/Arg) defines a polymorphism in a highly conserved region of the p53-inducible gene WAF1/CIP1. *Oncogene*. 1994;9(10):3021-4.
13. De Waal Malefyt R, Abrams J, Bennett B, et al. Interleukin 10(IL-10) inhibits cytokine synthesis by human monocytes: An auto-regulatory role of IL-10 produced by monocytes. *J Exp Med*. 1991;174(5):1209-20.
14. Chopra V, Dinh TV, Hannigan EV. Circulating serum levels of cytokines and angiogenic factors in patients with cervical cancer. *Cancer Invest*. 1998;16(3):152-9.
15. Szoke K, Szalmas A, Szladek G, et al. IL-10 promoter nt -1082A/G polymorphism and human papillomavirus infection in cytologic abnormalities of the uterine cervix. *J Interferon Cytokine Res*. 2004;24(4):245-51.

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