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# Biomarkers & Clinical Research

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## Trevor G Marshall

Autoimmunity Research Foundation, USA

### Biomarkers face an increasingly complex human biology

Human biology, or at least the understanding of the complexity of human biology, has exponentiated since the turn of the century. Previously it was thought that the human Genome, or at least its Transcriptome subset, expressed around 20,000 proteins. Yet the Human Proteome is currently estimated to be between 250,000 and 1 million proteins. Add to that the 42,000 components of the human Metabolome which have already been identified, and the process of identifying clinically useful biomarkers is becoming very difficult indeed. Our focus has been on yet another level of complexity, the Microbiome, understanding its biomarker contribution by both transcriptional and post-translational mechanisms. While studying the action of microbiome components on the VDR Nuclear Receptor we came to realize that the biomarkers loosely called “Vitamin D” were actually steroid transcriptional-factors, rather than “vitamins.” When we published this it seemed as though the whole world had descended on our shoulders. Clinical Medicine just didn’t want to know that what it thought was a biomarker for health was actually a biomarker for disease. Even today, now that the prospective studies are coming in, few appreciate the complexity of properly interpreting the “Vitamin D” biomarkers. Here we propose that TNF-alpha is also a compromised biomarker. The discovery that TNF-alpha release in the spleen is controlled primarily by the brain, and that brain immune activity is affected by the electrosmog which nowadays surrounds us, necessarily changes the way that this biomarker needs to be studied and interpreted.

### Biography

Trevor G Marshall graduated from the University of Adelaide, South Australia, in 1974. He taught at the Institute of Technology in Lae, Papua New Guinea, Curtin University and the University of Western Australia, before moving to California in 1982. His Doctoral thesis, ‘Insulin metabolism in Diabetes’, was accepted by the University of Western Australia in 1985. He is currently Director of the Autoimmunity Research Foundation in California. He has won US FDA Rare Disease Designations for minocycline and clindamycin in the treatment of sarcoidosis. He is a Fellow of the European Association for Predictive, Preventive and Personalised Medicine (Brussels) and a member of the International Expert Council, Community of Practice: Preventative Medicine (Moscow).

[Trevor@TrevorMarshall.com](mailto:Trevor@TrevorMarshall.com)

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