



## Single Nucleotide Polymorphisms and Suicidal Behaviour

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### Abstract:

A major worldwide social health issue is suicide and suicidal behavior. Recently, research has been undertaken in order to support the theory that there is a definitive link between certain genetic factors and the prevalence of suicide. It is estimated by the World Health Organization (WHO), that suicide is responsible for approximately 2% of annual worldwide deaths. Unfortunately, the etiology of this has proven to be exceptionally complex, but the studies carried out have pointed towards genetic factors as a possible leading cause. Suicidal attempters (SA) and suicidal behavior is considered complex due to the interaction between various environmental as well as genetic factors. These factors being: alcohol and substance abuse, psychiatric disorders, stress, among other features. In accordance with the studies carried out, evidence points towards cytokines and their respective single nucleotide polymorphisms (SNPs) as enacting a key role in disrupting specific neurobiological pathways. What these studies show, is that by single nucleotide polymorphisms (SNPs) in select genes coding for cytokines within the serotonergic and dopaminergic neurobiological pathways lead to increased rates in suicidal tendencies as well as an increased susceptibility to various confounders, that themselves, act as risk factors for suicide attempters (SA). SNPs are defined as single nucleotide substitutions between a single base from the four nucleotide bases A, T, C, and G for another. This means that there are up to four possible genome combinations or versions for each single SNP location, due to the four different bases available. In order for SNP classification, two or more versions of these SNP versions must be present and expressed in at least 1% of the general population. The distinct types of SNPs that exist:

Linked (indicative) SNPs: SNPs which are neither present in the relevant genes, nor



Are they affecting protein function in any way? Nonetheless they do play a role in specific drug responses, and disease incidence.

Causative SNPs: SNPs which exist within the relevant genes and affect protein

Function and in turn affect suicidal tendencies and drug response. The two types of causative SNPs being: SNPs which are neither present in the relevant genes, nor are they affecting protein function in any way. Nonetheless they do play a role in specific drug responses, and disease incidence.

### Publication of speakers:

1. Willour VL, Seifuddin F, Mahon PB, Jancic D, Pirooznia M, Steele J, et al. A genome-wide association study of attempted suicide. *Mol Psychiatry* [Internet]. 2011 Mar 22 [cited 2015 Oct 1];17(4):433-44. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4021719&tool=pmcentrez&rendertype=abstract>
2. Mullins N, Perroud N, Uher R, Butler AW, Cohen-Woods S, Rivera M, et al. Genetic relationships between suicide attempts, suicidal ideation and major psychiatric disorders: A genome-wide association and polygenic scoring study. *Am J Med Genet Part B Neuropsychiatr Genet* [Internet]. 2014 Jul 25 [cited 2015 Oct 1];165(5):428-37. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4309466&tool=pmcentrez&rendertype=abstract>

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