The Terrorist Within

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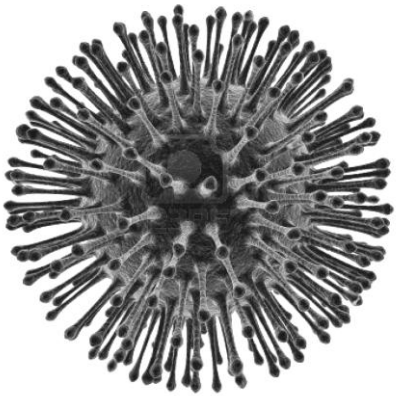

There are individuals and groups amongst us who are indiscriminately spreading terror, fear, misery and death worldwide without concern. Crossing borders at will, they live among us until triggered into action by coercion, force, collective will, stress or inherited ideals. We've tried to eradicate them, but often the innocent suffer too, but now we are taking the fight to them at a much more basic level. We are infiltrating their societies, destroying their communication pathways, identifying the impressionable and keeping them under surveillance and reacting before any real damage can be done. We are tricking groups into activity before they are truly ready, making them easier to deal with. Global terrorism? No, these are the battles being raged every day within our bodies against the pathogens that can so profoundly affect us.

This new fight is at a genetic level. Genetic research has already led to great benefits in our fight against disease, in particular, cancer. A genetic link for breast cancer had been apparent for many years but now a number of faulty genes, BRCA1/2 for example, have been identified and appropriate interventions or treatments given to those who carry the faulty genes. Traditional treatments for cancer have been drastic and indiscriminate, damaging healthy as well as cancerous cells. But now DNA sequencing is identifying the events driving the development of disease, isolating the chemical triggers within the cells, assisting in the development of inhibitors or blockers preventing cell disruption. There are many of these new targeted therapies in use today, Gefitinib, Crizotinib, PARP Inhibitors etc; which as their names suggest are targeted on the affected cells, providing less indiscriminate treatments. But the success even of these is dependent on the type of driver or event causing tumour initiation/progression. DNA sequencing of patients to identify those who will respond best to the targeted therapies is leading to a much more tailored form of medicine called 'stratified medicine.'

Genetic research is unlocking many of the mechanisms by which organisms cause disease and some of these can be truly amazing for so called simple organisms. Candida Albicans is a normally harmless fungus living in most of us, but environmental stress factors can cause them to change resulting in a number of problems for us, from 'Thrush' to a potentially fatal condition called 'Candidaemia.' Resistance to antimicrobial agents makes it difficult to treat but genomic sequencing is identifying the chemical triggers that start these changes, giving the potential for targeted therapies to combat. Bacteria are capable of collective action, delaying attacks on our immune system until the colony is strong enough to overwhelm the body's defenses. This communication or 'Quorum Sensing' is by chemical triggers, genetic research is looking to produce antagonists which would stimulate them to attack before the colonies are big enough to overwhelm us and our own immune system could then deal with them.

As antibiotic resistance grows, genomic medicine offers us a growing toolbox to fight disease and great hope for the future.