

## **GEOCHEMISTRY & HEALTH AND MEDICAL GEOLOGY INTO THE 21<sup>ST</sup> CENTURY**

---

Fiona Fordyce

---

British Geological Survey, West Mains Road, Edinburgh, EH9 3LA, UK

---

Since ancient times man has known of the effects of environmental factors on health but it is only in the last 100 years or so that these links have been understood scientifically. Geochemistry in its strictest sense is the study of rock chemistry and at first it may seem there is little connection with human health. However, rocks are a major source of the 92 naturally occurring chemical elements found on Earth. Approximately 25 of these are known to be essential to plant and animal life in trace amounts, including Ca, Mg, Fe, Co, Cu, Zn, P, N, S, Se, I and Mo. On the other hand, an over-abundance of these elements can cause toxicity problems. Some elements such as As, Cd, Pb, Hg and Al have no/limited biological function and are generally toxic to humans. Rocks break down to form the soils on which we grow our crops and raise animals and the water that we drink travels through rocks as part of the hydrological cycle. Hence, via the food chain there are direct links between geochemistry and health and a need to understand the environmental behaviour of these elements. Also of concern in more recent years are the concentrations of synthetic products such as the persistent organic pollutants (POPs) and endocrine disrupter chemicals (EDCs), which although man-made in origin, are transported through the natural environment where geochemical controls can determine their fate. Our knowledge of the distribution, mobility and health effects of all these substances has greatly improved since the 1950s with advances in analytical chemistry. As a result, the field of 'Environmental Geochemistry and Health' has been well established over the last 30 years. In conjunction with veterinary, medical and ecological sciences, this field has contributed to the present day awareness of the impacts of man on the environment and the environment on man at the global scale and increasingly, regulatory guidelines are in place in many parts of the world to mitigate these impacts. In light of this growing environmental concern, the International Union of Geological Sciences has established a Working Group and International Association on Medical Geology. The term 'Medical Geology' has been coined to compliment other established fields such as Medical Geography and aims to address the human public health impacts (and the well-being of other organisms) of geological materials and processes. In this sense the field of Medical Geology includes 'Geochemistry and Health' but has a broader remit involving Environmental Mineralogy (including bone mineralogy; volcanic and other dusts and mineral aerosols and particulates such as asbestos and other fibrous minerals); Water and Sanitation (the provision of adequate drinking water free from biological as well as chemical contaminants has been identified as the number one priority in the fight against world poverty) and Disease Migration (the influence of environmental factors). This new initiative will be introduced.