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Associations between Diseases and the Natural Environment

Abstract

Many associations between occurrences of human diseases and qualities of the natural environment have been identified. Search for additional associations of this type may lead to new hypotheses for risk factors in endemic diseases with incompletely known aetiology. Geochemical maps show that systematic natural dispersion patterns with high contrasts exist at all scales from local to continental for many chemical elements providing an interesting material for comparisons of epidemiological and environmental data.

The paper demonstrates two geomedical examples, one from China and one from Norway. In China, inspection of maps uncovered that exceptionally high rates of *nasopharyngeal carcinoma* in the south eastern part of the country are associated with high contents of U and Th as well as low contents of Mg, Ca and Sr in soil. In Norway, application of a new method for spatially moving correlation analysis disclosed that in Southern Norway high rates of *multiple sclerosis* are associated with high contents of Rn in indoor air as well as with low atmospheric fallout of marine Mg. No similar associations were found in Northern Norway. Based on these data it is suggested that Rn or other radioactive elements may be risk factors in both *nasopharyngeal carcinoma* and *multiple sclerosis*. Development of increased levels in soils of Ra^{2+} - which by radioactive disintegration is a progeny of Th and U and a precursor of Rn - may perhaps be counteracted by ion exchange with Mg^{2+} at rates which increase with increasing Mg supply.

The data indicate that ecological studies in epidemiology should preferably be carried out by comparing maps or by spatially moving statistical analyses, since geomedical associations may vary geographically and in a non linear manner. There are many possible mechanisms explaining links between occurrences of human diseases and environmental factors, of which the possibility of reactivation of latent virus by natural ionising radiation, seems to be of special interest in connection with the diseases studied here. The paper concludes that ecological investigations have a great potential for obtaining interesting geomedical results in epidemiology.