SOIL: THE ESSENCE OF MEDICAL GEOLOGY

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Abstract: Soil is the naturally occurring, unconsolidated mixture of minerals and organic matter that covers most of the Earth’s land surface. Of all the geologic materials and processes that impact animal and human health, soil may be the most significant. All essential nutrients are ultimately derived from crops grown on soil, animals that graze on soil, or water that has been in contact with the soil. We inhale soil particles in the dust that we breathe. Children, and some adults, eat soil and some medications, especially those used by indigenous peoples, are derived from soil. Soils deficient in essential elements are believed to contribute to diseases such as Keshan Disease and Kashin-Beck Disease in China attributed to Se deficiency. Soils deficient in multiple essential elements have been cited as the cause of Mselani Joint Disease in South Africa. Soils enriched, by natural or anthropogenic activities, in potentially toxic trace elements have contributed to worldwide lead poisoning, selenium poisoning in China, fluorosis in areas of active volcanism, thallium poisoning in China. Radon released from soil is a major contributor to lung cancer. Inhaled minerals from wind-blown soils can cause silicosis and asbestosis. Soil particles can act as a host for numerous human and animal pathogens. In the U.S. and Mexico inhalation of wind-blown soils hosting fungal spores have caused Valley Fever. Clay derived from selected soils has been used for millions of years to settle upset stomachs and counteract the actions of certain poisons. Clays have also been used as a poultice and has been effective is stopping Buruli Ulcer (flesh eating bacteria). The benefits and detriments of geophagy have been hotly debated for decades. Better knowledge of the soils mineralogical, trace element, and zoonotic composition can help prevent many health problems and advance its therapeutic uses.