The numerous negative health effects that have been associated with chemical pesticides include, among other effects, dermatological, gastrointestinal, neurological, carcinogenic, respiratory, reproductive, and endocrine effects. The type of pesticide, the duration and route of exposure, and the individual health status (e.g., nutritional deficiencies and healthy/damaged skin) are determining factors in the possible health outcome. The last research untangles complex interactions between genetic variation, pesticide exposure, and Parkinson's disease. Such gene-environment interaction is termed G x E. Scientists showed that two pesticides have been linked to Parkinson's — paraquat and a plant-derived pesticide called rotenone. Paraquat has a chemical structure similar to MPTP.

So, according to the information mentioned above, there are two opposite points of view. Use of pesticides provides economic and social benefits as they help to keep food prices relatively low and pesticides are potentially toxic for living organisms, including humans. Where is true? Somewhere between these ideas. People should protect their crops from pests to have food, but these protective mechanisms should be safe for the health and environment.

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## FEATURES OF THE SPREAD AND INFECTION OF *PLASMODIUM KNOWLESI*

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According to WHO, the number of cases of malaria infection is up to 500 million annually and is growing by 16% annually. In addition to the 4 known species of *Plasmodium*, malaria is also caused by the previously unknown *P. knowlesi*. To date, it has been proven that *P. knowlesi* is able to infect not only monkeys, as was previously known, but also humans. This new species of the causative agent of the disease was discovered relatively recently in Southeast Asia (Malaysia) and therefore is still quite poorly studied. Taking into account the annual increase in the incidence of malaria, including *P. knowlesi*.

The aim of this work is to characterize the spread and infection of humans with this parasite species.

The life cycle of *P. knowlesi* is the shortest of all known *Plasmodium* species in both humans and animals, which explains the daily attacks of malaria in these patients. In this case, both young and old erythrocytes are damaged, which causes the development of high parasitemia, and the development of parasites in these cells is asynchronous. The large number of *knowlesi*-malaria cases in humans indicates that *P. knowlesi* is more capable of infecting humans than other *Plasmodium* species that cause malaria in primates. If natural human-mosquito-human transmission is established, *P. knowlesi* can spread even more in Asia. As in the case of infection with the four more well-known species, a person becomes infected with *P. knowlesi* at the time of inoculation by a female of malaria mosquito at one of the life cycle stages of the pathogen (so-called sporozoites) into the blood or lymphatic system, which occurs during bloodsucking. After a short stay in the blood, the malaria *Plasmodium* sporozoites penetrate into the hepatocytes of the liver, thereby giving rise to the preclinical hepatic (exoerythrocytic) stage of the disease. In the process of asexual reproduction, called schizogony, from one sporozoite, about 2.000 to 40.000 hepatic merozoites, or schizonts, are eventually formed. In most cases, these daughter merozoites re-enter the bloodstream after 1-6 weeks. Diagnostic errors are associated with morphological similarities between *P. knowlesi* and *P. malariae* – the blood stages of reproduction of these two parasites are very difficult to distinguish under light microscopy. However, *P. malariae* multiplies after 72 hours and never reaches dangerously high blood densities, *P. knowlesi* causes malaria with daily attacks, and without treatment, the pathogen can quickly reach a potentially fatal density.

Thus, *P. knowlesi* is the fifth malaria parasite that, after crossing the interspecies barrier, causes a special type of zoonotic malaria in humans, usually affecting macaques. This pathogen differs from other *Plasmodium* species in the shortest life cycle, which explains the daily attacks leading to severe and often fatal outcomes.