

P. knowlesi model to study P. vivax

Commonly used acronym: *Pk model*

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Organisation

Name of the organisation Institute of Tropical Medicine, Antwerp

Department department of Biomedical Sciences

Country Belgium

Partners and collaborations

Royal Veterinary College

SCOPE OF THE METHOD

The Method relates to	Human health
The Method is situated in	Basic Research
Type of method	In vitro - Ex vivo
Specify the type of cells/tissues/organs	red blood cells

DESCRIPTION

Method keywords

P. knowlesi
P.vivax
malaria
transgenics
CRISPR-Cas9

Scientific area keywords

malaria
drug-resistance
genetics
parasitology

Method description

The lack of a continuous *in vitro* culture system for P. vivax has made it impossible to genetically engineer P. vivax for mechanistic research studies. One alternative that is

being used is the infection of non-human primates, however this is restricted to few laboratories across the world. An additional alternative is the use of *P. knowlesi*, a Plasmodium species closely related to *P. vivax* that can be cultured *in vitro*. *P. knowlesi* is the zoonotic monkey parasite, which was adapted to grow in human erythrocytes. The ease of genetic manipulation of *P. knowlesi* using CRISPR-Cas9 methodologies and its successful use as surrogate for homologous genes of *P. vivax* make it an ideal model to study the function of *P. vivax* genes. We use genetic-engineering strategies in a *P. knowlesi* transgenic model to replace *P. knowlesi* genes with *P. vivax* homologues using CRISPR-Cas9 technology.

Lab equipment

- L2 culture facilities;
- Genomic platforms.

Method status

Internally validated
Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages

P. knowlesi transgenic model / *in vitro* culture allows to investigate gene function of *P. vivax* as an alternative model to *P. vivax* infection of non-human primates.

Challenges

The expression of *P. vivax* genes in a *P. knowlesi* parasite.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

Links

<https://pubmed.ncbi.nlm.nih.gov/33654746/> <https://pubmed.ncbi.nlm.nih.gov/31205...>

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