P. knowlesi model to study P. vivax

Commonly used acronym: *Pk model*

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Contact person

Anna Rosanas-Urgell

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…