

Virus transmission during kidney transplantation assessed by virome analysis of living donor and recipient

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Solid organ transplantation and transmission of viruses

Routine screening prior to living donor kidney transplantation

Serology

- HIV 1/2
- HTLV I/II
- Hepatitis A/B/C/E
- HSV, CMV, EBV
- Measles, Mumps

PCR

- Hepatitis B/C

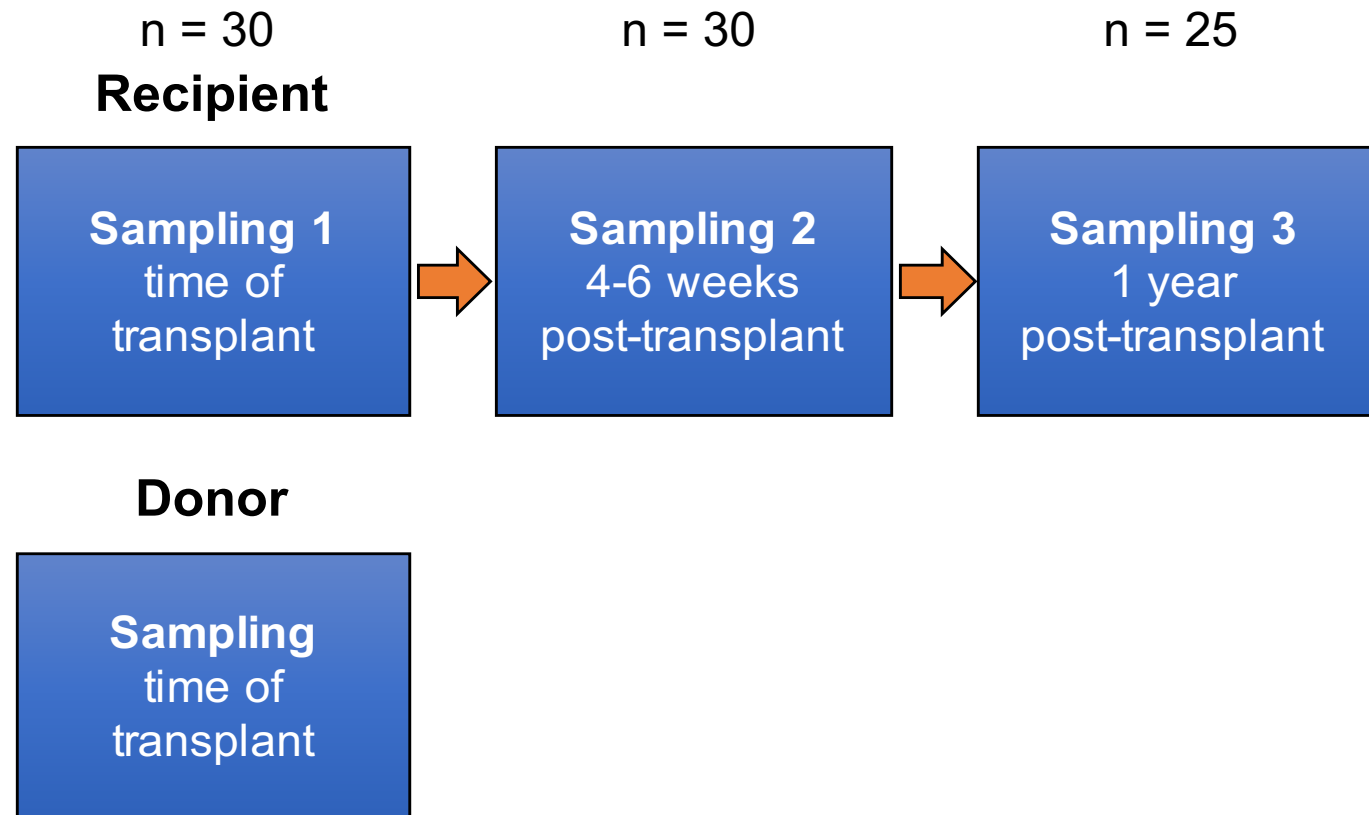


Little is known about other untested, apathogenic viruses a donor might carry and likely will transmit

Kidney transplant living donor/recipient pairs

Sampling

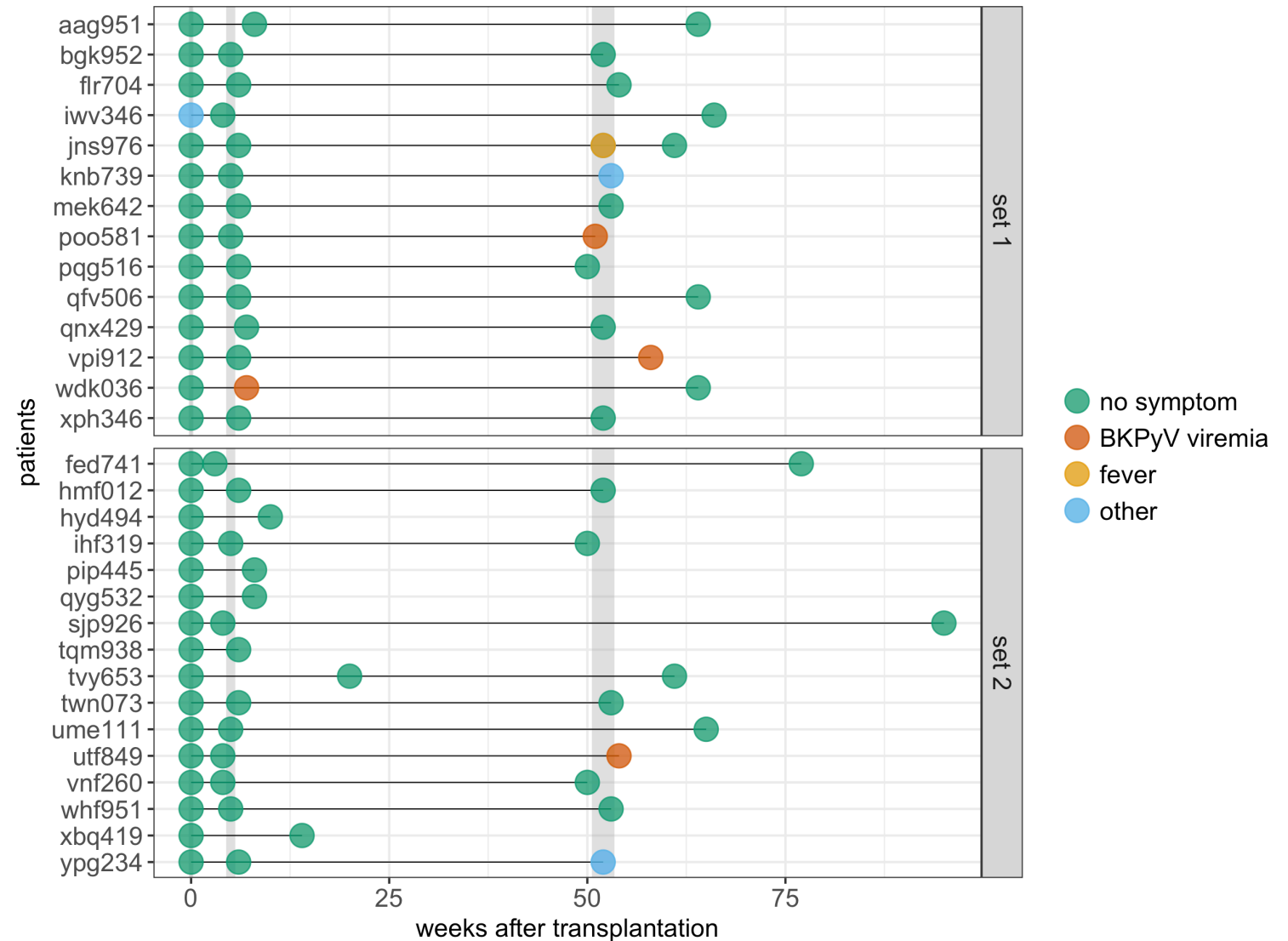
- University Hospital Zurich
- Enrollment of donor/recipient pairs since August 2014
- Each sampling consists of:
 - Blood
 - Urine
 - Stool



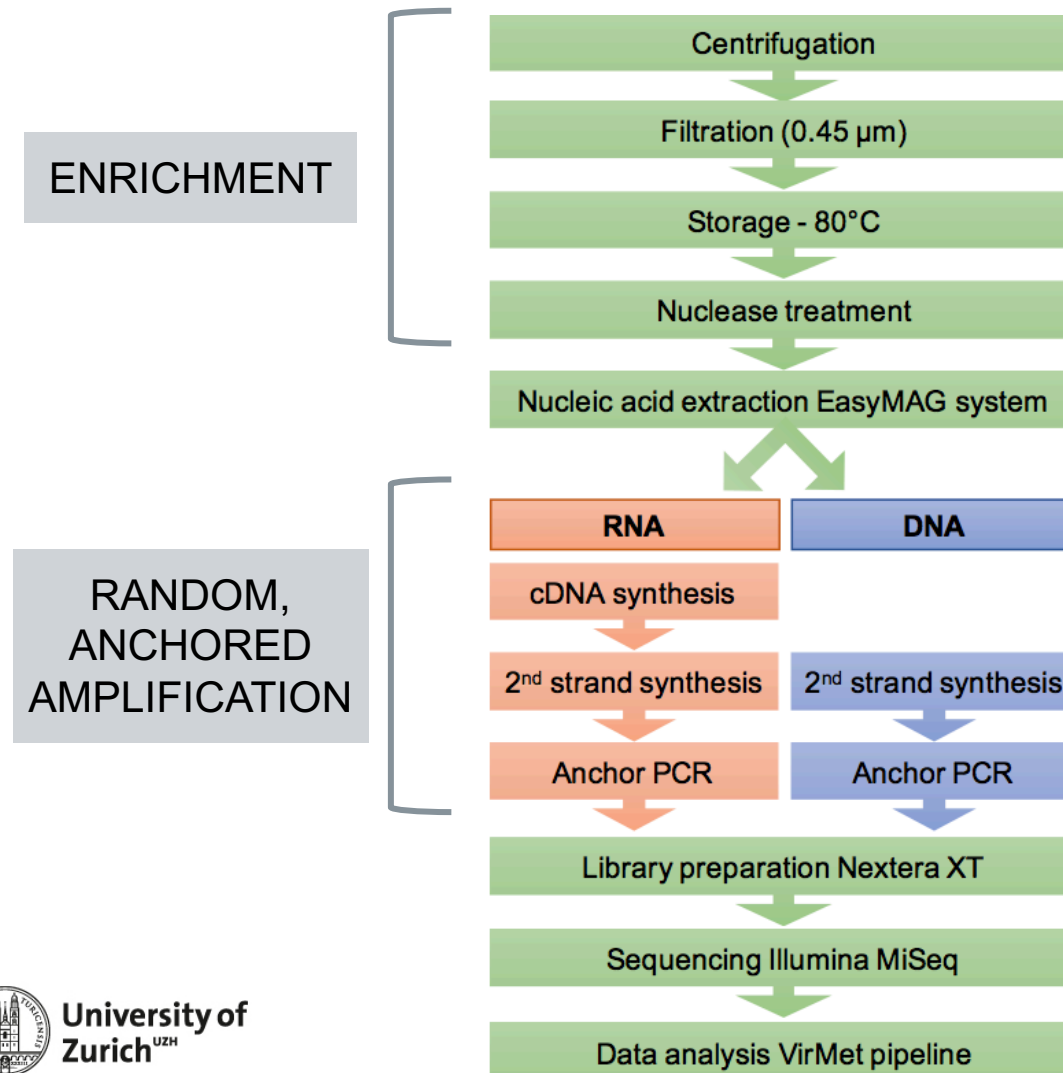
Kidney transplant living donor/recipient pairs

Evaluated symptoms

- Immunosuppressive therapy
- Antiinfective prophylaxis



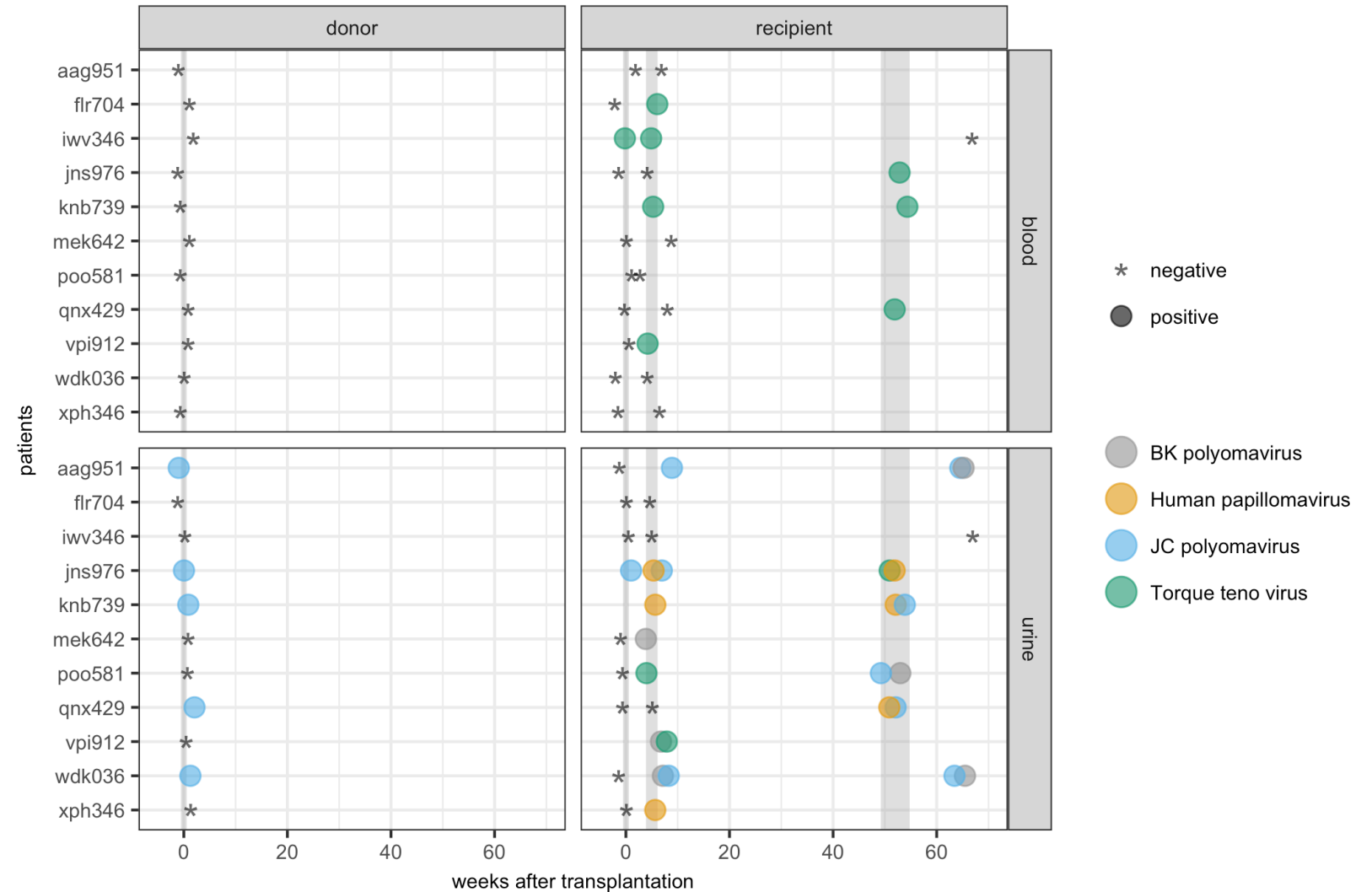
Viral metagenomic sequencing



- read length 150 bp
- ~ 3-5 Mio. reads/sample

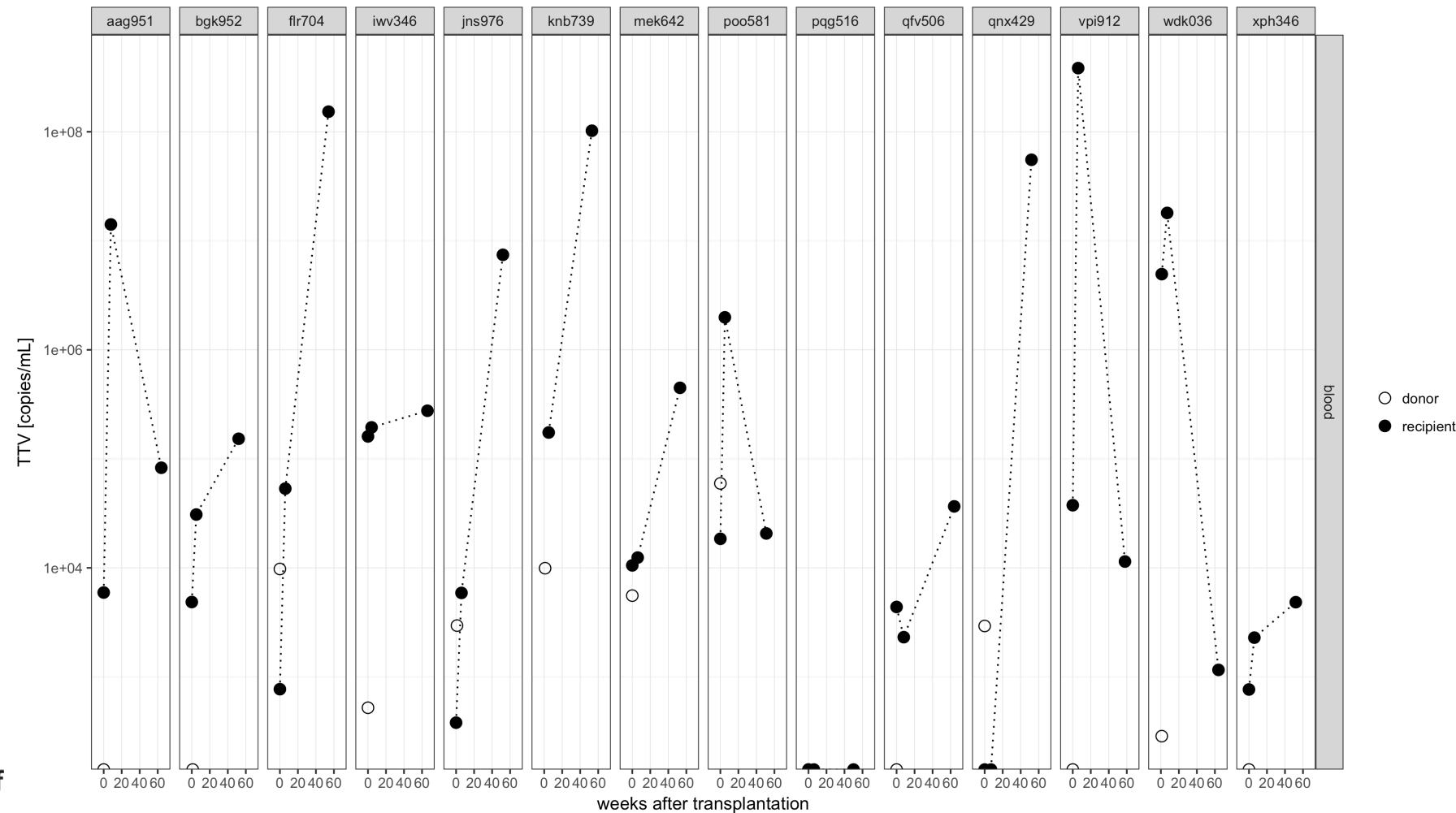
**VirMet: a set of tools
for viral metagenomics**

Metagenomic sequencing detected BKPyV, JCPyV, HPV and TTV in blood and urine samples of donors and recipients (set 1)



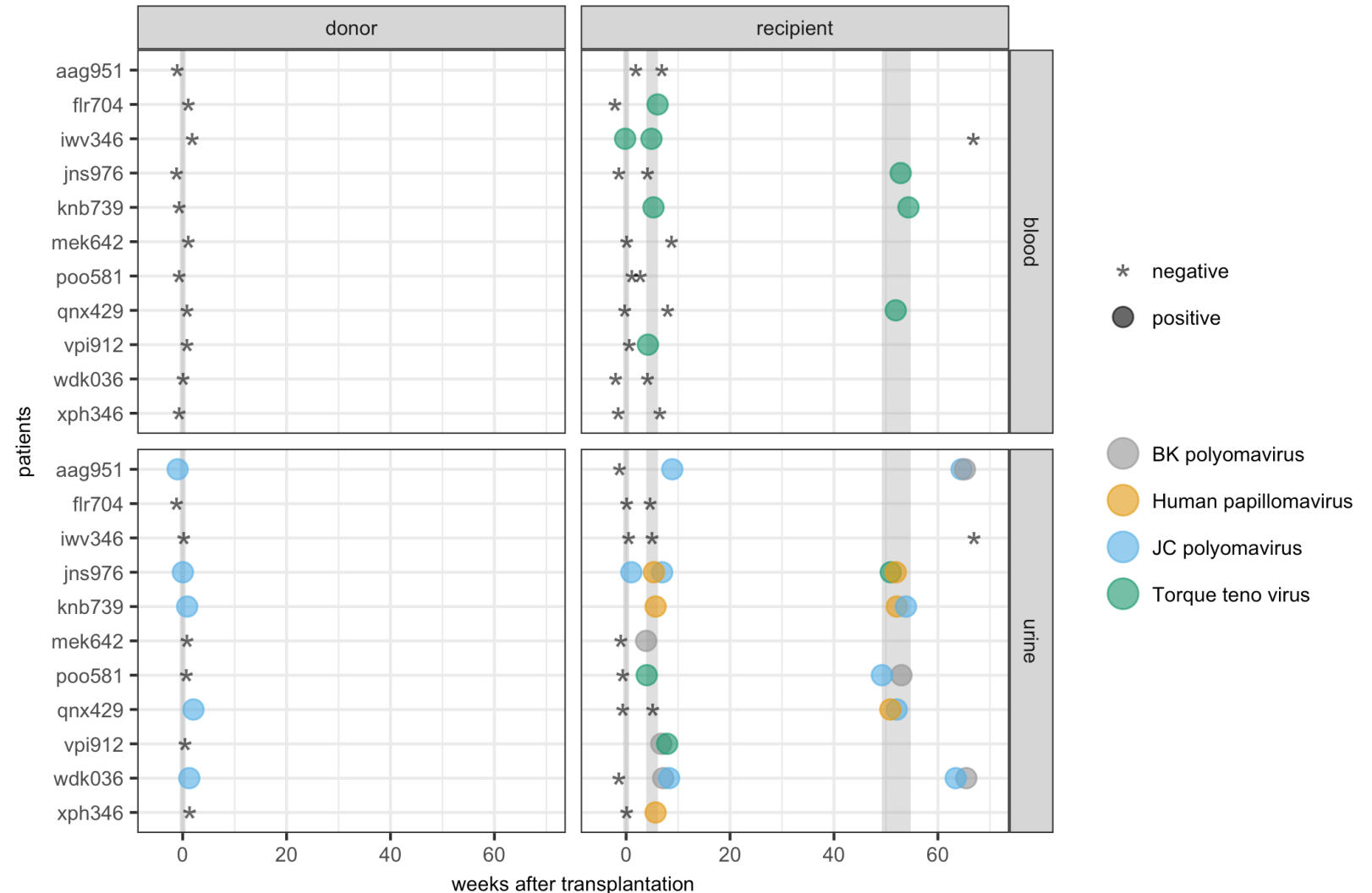
TTV viral loads increased in kidney transplant recipients under immunosuppression

- Lewandowska et al., 2017
- Young et al., 2015
- Görzer et al., 2015
- Görzer et al., 2014
- Jones et al., 2005
- Maggi et al., 2003

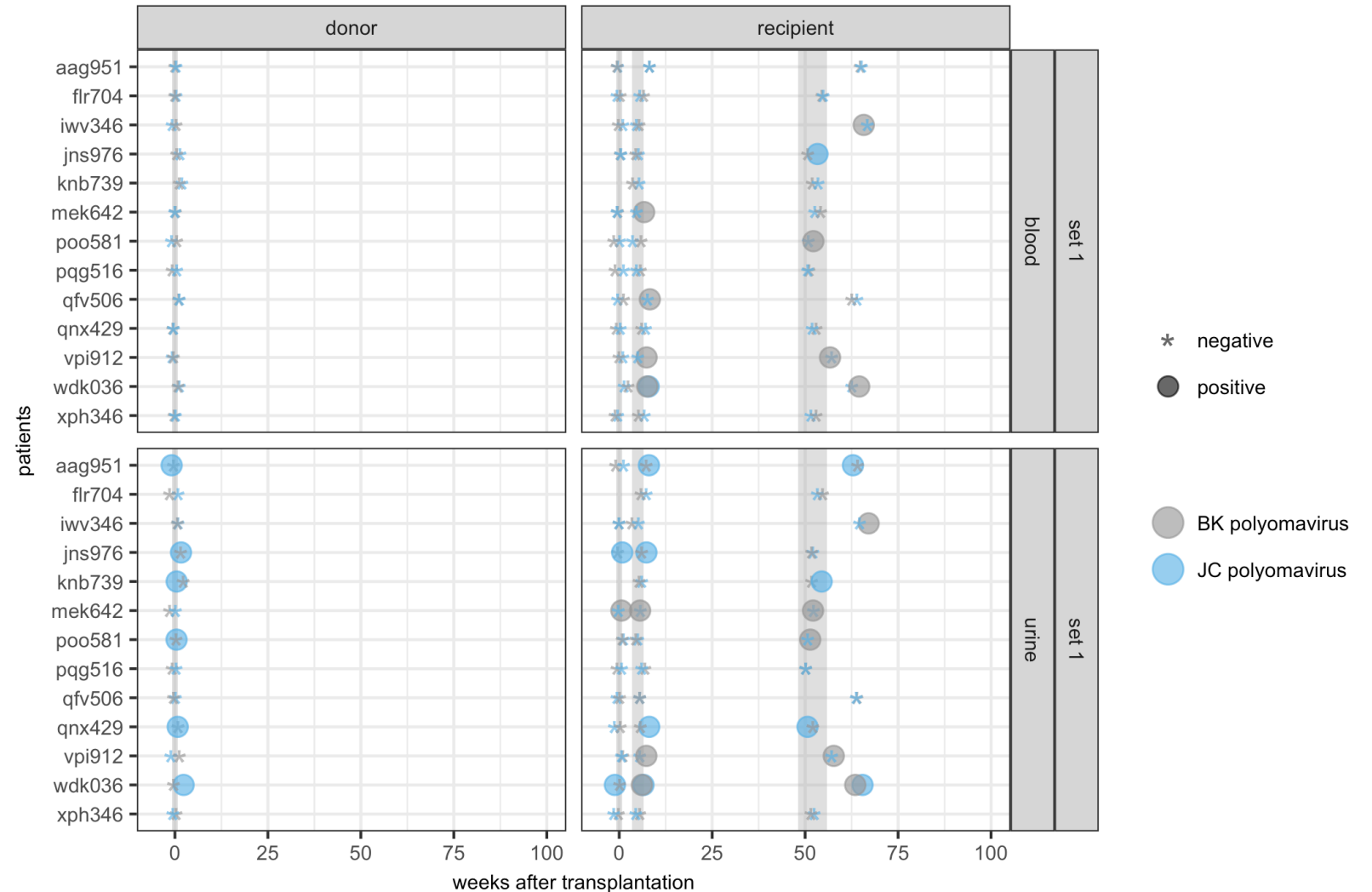


Metagenomic sequencing detected BKPyV, JCPyV, HPV and TTV in blood and urine samples of donors and recipients (set 1)

Suggested transmission of JCPyV from donors to recipients

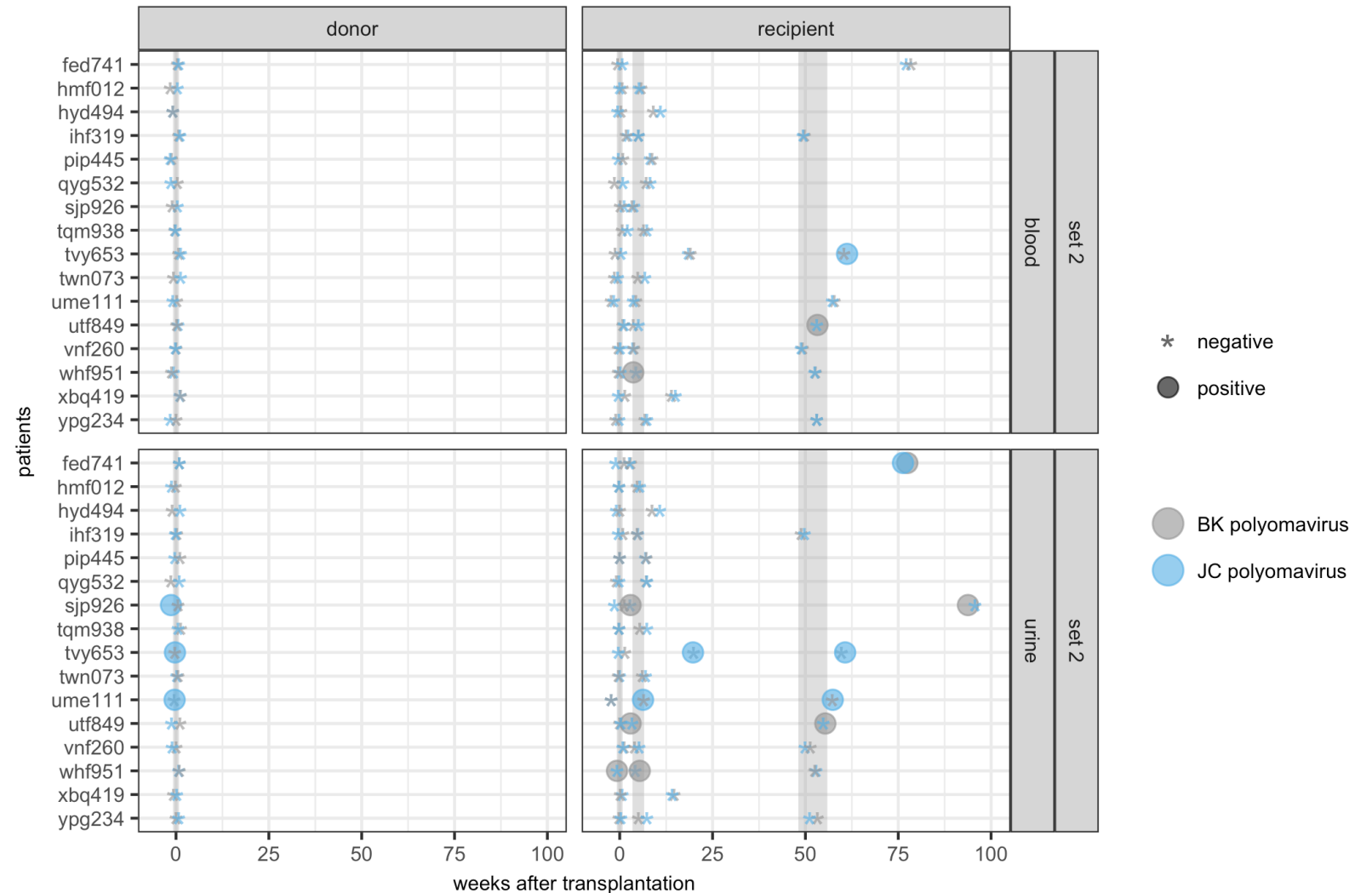


Sequence-specific qPCR confirmed metagenomic sequencing results (set 1)

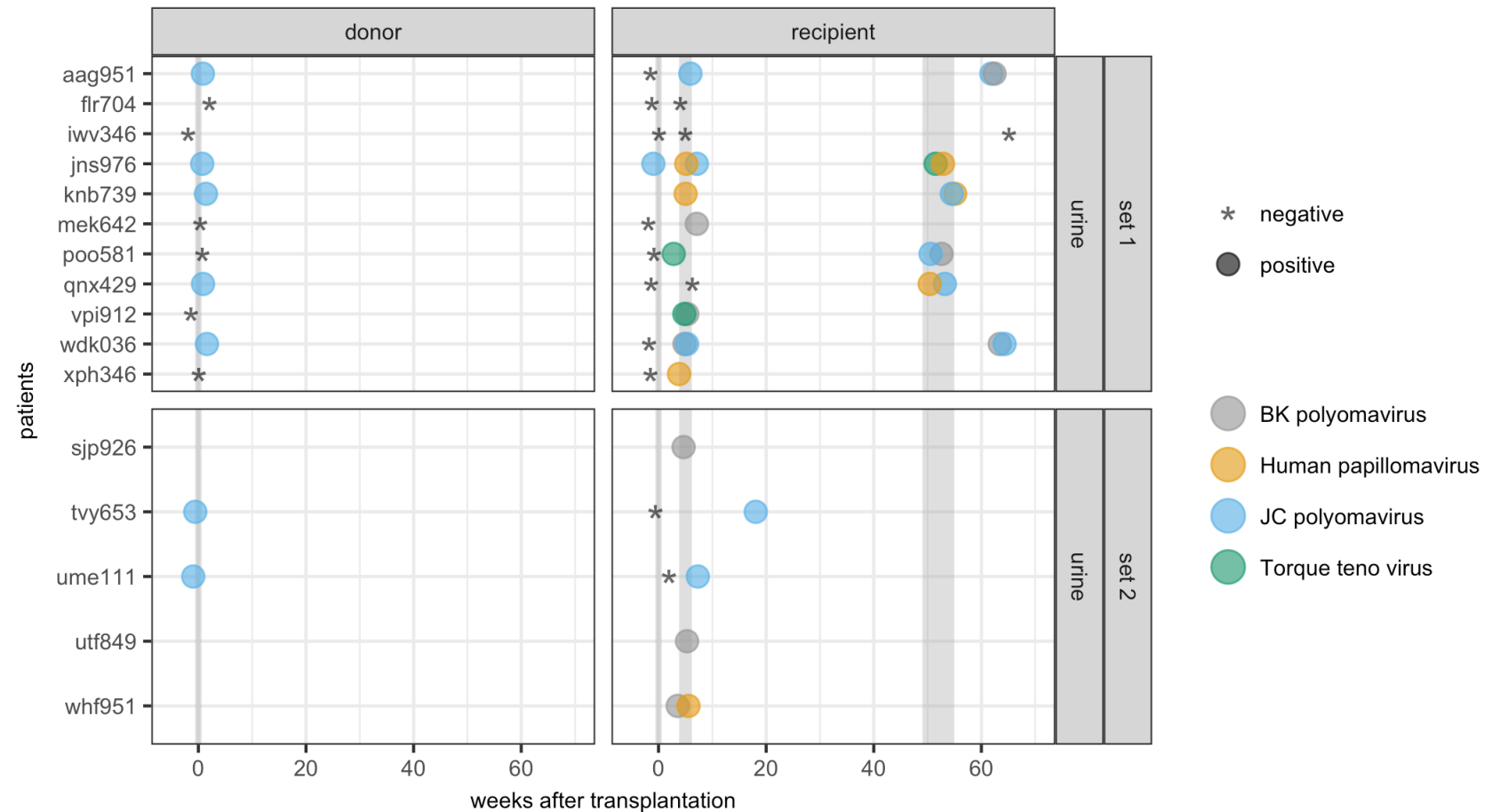


Sequence-specific qPCR identified cases of possible virus transmission (set 2)

Revealed 2 additional cases of JCPyV transmission from donor to recipient

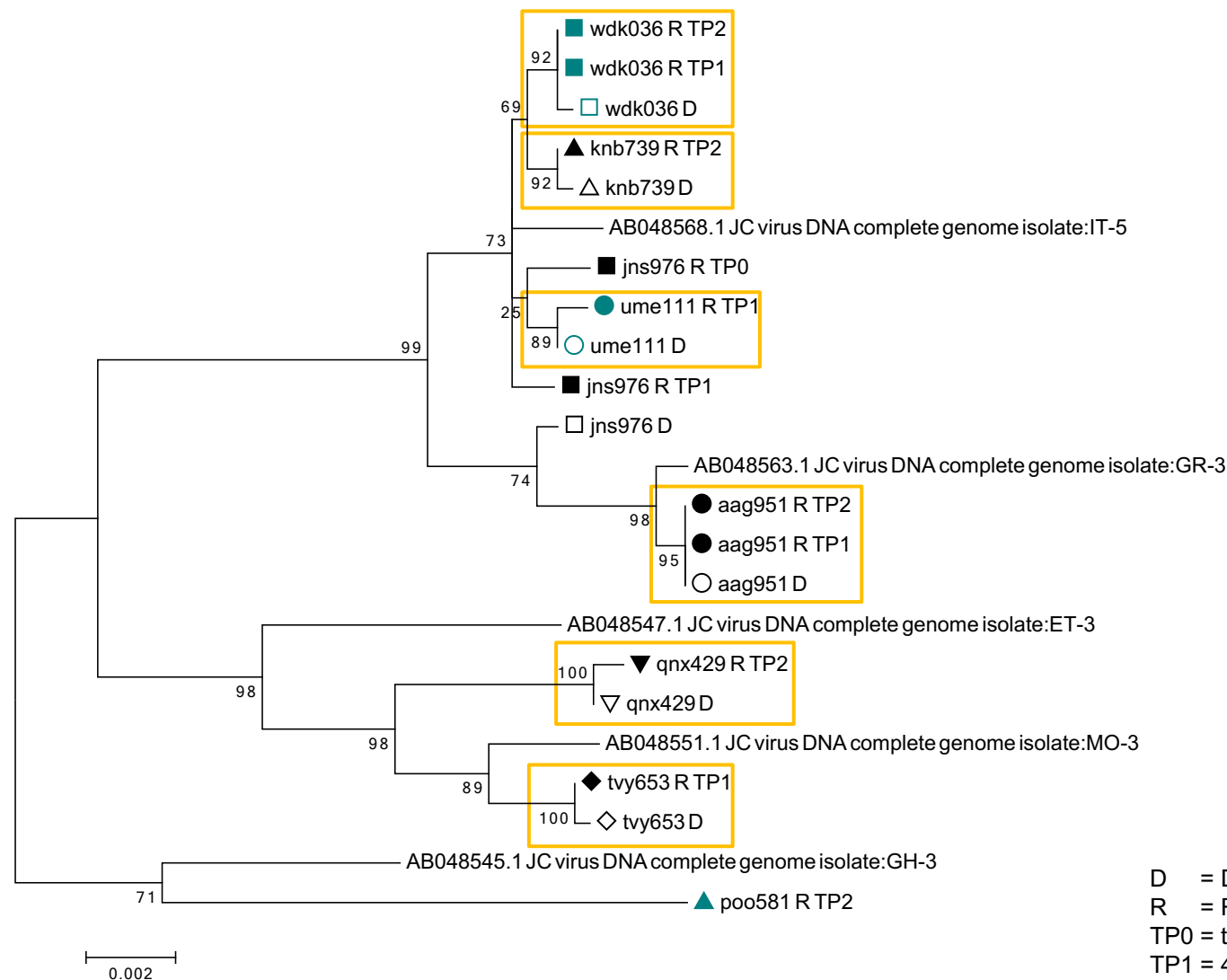


Suggested transmission of JCPyV from donors to recipients in 7 cases



Phylogenetic analysis of JCPyV isolates revealed clusters of donor-recipient pairs

Confirmed transmission of JCPyV
from donors to recipients
in 6 out of 7 cases



- Metagenomic sequencing detected BKPyV, JCPyV, HPV and TTV (no other viruses were detected)
- Sequence-specific qPCR detected additional cases of BK-/JCPyV
- Phylogenetic analysis confirmed transmission of JCPyV from kidney transplant donors to recipients in 6 out of 7 cases
- TTV was detected by metagenomic sequencing and viral loads increased in kidney transplant patients under immunosuppression (qPCR)
- The role of JCPyV infection after renal transplantation is so far poorly defined
- Further studies are needed to define the impact of the donor's virome on the recipient and predict transplant outcomes

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