

**Table S1.** PCV2 isolates in southern China used in the present study.

Isolates	Age (wk)	Isolate tissue	Genome size (nt)	Origin (Province in China)	Year of isolation
JXPX-1-1	12	spleen, lymphoid node, lung, kidney, liver	1768	Jiangxi	2013
CS-1-1	9	spleen, lymphoid node, lung, kidney, liver	1767	Hunan	2013
CS-1-2	8	spleen, lymphoid node, lung, kidney, liver	1767	Hunan	2013
CS-1-4	10	spleen, lymphoid node, lung, kidney, liver	1767	Hunan	2013
CS-1-5	3	spleen, lymphoid node, lung, kidney, liver	1767	Hunan	2013
CS-3-1	7	spleen, lymphoid node, lung, liver	1767	Hunan	2013
CS-3-2	8	spleen, lymphoid node, lung, liver	1767	Hunan	2013
XT-1-1-1 <sup>★</sup>	16	spleen, lymphoid node, lung	1767	Hunan	2013
XT-1-1-2 <sup>★</sup>			1767		
YueY-2-2	5	spleen, lymphoid node, lung	1767	Hunan	2013
YueY-3-1	13	spleen, lymphoid node, lung	1767	Hunan	2013
SY-6-2	11	spleen, lymphoid node, lung, heart	1767	Hunan	2013
SY-6-3	12	spleen, lymphoid node, lung, heart	1767	Hunan	2013
YiY-1-1	6	spleen, lymphoid node, lung	1767	Hunan	2014
YiY-1-2	8	spleen, lymphoid node, lung	1767	Hunan	2014
YiY-1-3-1 <sup>★</sup>	5	spleen, lymphoid node, lung	1767	Hunan	2014
YiY-1-3-2 <sup>★</sup>			1767		
YiY-1-4	7	spleen, lymphoid node, lung	1767	Hunan	2014
YiY-1-5	9	spleen, lymphoid node, lung	1767	Hunan	2014
YiY-2-2	16	spleen, lymphoid node, lung	1767	Hunan	2014
YiY-2-4	16	spleen, lymphoid node, lung	1767	Hunan	2014
YiY-2-6-1 <sup>★</sup>	16	spleen, lymphoid node, lung	1767	Hunan	2014
YiY-2-6-2 <sup>★</sup>			1767		

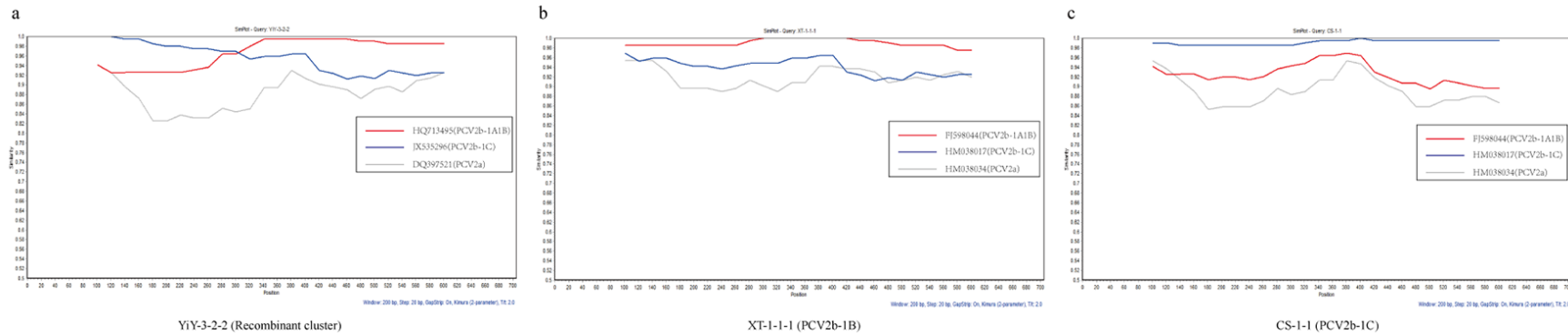
YiY-2-7-1*	13	spleen, lymphoid node, lung	1767	Jiangsu	2014
YiY-2-7-2*			1767		
YiY-2-8-1*	5	spleen, lymphoid node, lung	1767	Hunan	2014
YiY-2-8-2*			1767		
YiY-2-9-1*	12	spleen, lymphoid node, lung	1767	Jiangsu	2014
YiY-2-9-2*			1767		
YiY-2-11	5	spleen, lymphoid node, lung	1767	Jiangsu	2014
YiY-2-12	12	spleen, lymphoid node, lung	1768	Hubei	2014
YiY-2-13-1*	12	spleen, lymphoid node, lung	1767	Hunan	2014
YiY-2-13-2*			1767		
YiY-3-2-1*	8	spleen, lymphoid node, lung	1767	Hubei	2015
YiY-3-2-2*			1767		
YiY-3-3	16	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-10	12	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-12	16	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-13-1*	12	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-13-2*			1767		
YiY-3-14	12	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-20	8	spleen, lymphoid node, lung	1767	Hubei	2015
YiY-3-23	16	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-24	16	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-27	8	spleen, lymphoid node, lung	1767	Hubei	2015
YiY-3-28-1*	12	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-28-2*			1767		
YiY-3-29-1*	16	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-29-2*			1767		

YiY-3-30	12	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-31-1*			1767		
YiY-3-31-2*	16	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-33	16	spleen, lymphoid node, lung	1767	Jiangsu	2015
YiY-3-34-1*			1767		
YiY-3-34-2*	5	spleen, lymphoid node, lung	1767	Jiangsu	2015
YiY-3-36-1*			1767		
YiY-3-36-2*	5	spleen, lymphoid node, lung	1767	Jiangsu	2015
YiY-3-39	12	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-40	8	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-45	8	spleen, lymphoid node, lung	1767	Hunan	2015
YiY-3-46-1*			1767		
YiY-3-46-2*	16	spleen, lymphoid node, lung	1767	Hunan	2015

The 2 PCV2 isolates obtained from the same pig (15 groups) were indicated with a star (\*).

**Table S2.** Oligonucleotide primers used in this study.

Primer name	Sequence (5'-3')	Primer size (bp)	Product length (bp)	Position	Refer GenBank no.
pPCV2-cap-F-ZY009	CCA TAT GAA ATA AAT TAC TGA G	22	702	1734-1715	AY484416
pPCV2-cap-R-ZY010	CAG CGC ACT TCT TTC GTT TTC AG	23		1033-1059	
pPCV2-FL-F-Kpn I-ZY001	CGG <i>GGTACC</i> ACT GAG TCT TTT TTA TCA CTT CG	32	1777 or 1778	991-1013	AY321991
pPCV2-FL-R-Hind III -ZY002	CCC <i>AAGCTT</i> AAG ACT CAG TAA TTT ATT TCA TAT GG	35		1000-975	
pPCV2-FL-Seq001	TGA AGA TGC CAT TTT TCC	18	/	1599-1616	
pPSP72-BSP6-Seq002	TCG TTA GAA CGC GGC TAC	18	/	2393-2410	X65332

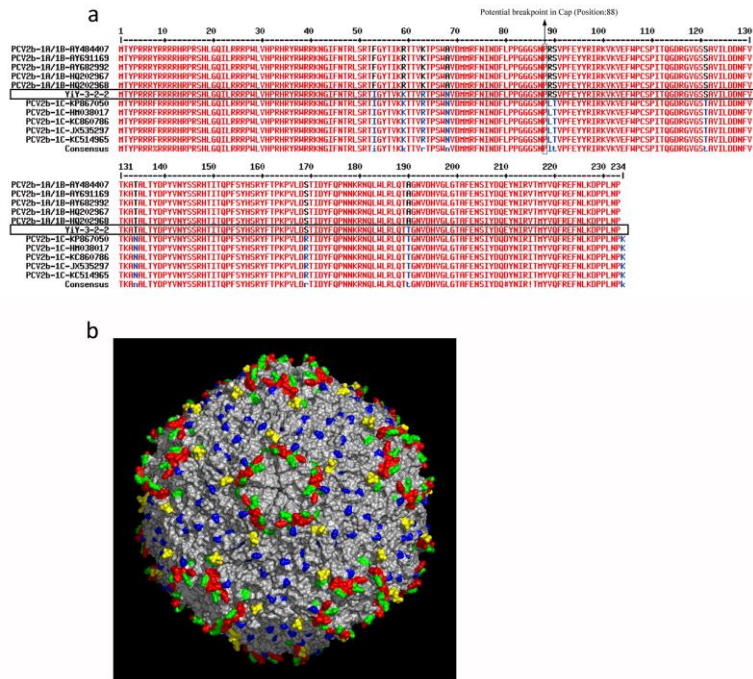


**Fig. S1** Analyses of PCV2 genome recombination

a) The *cap* gene of the new cluster (YiY-3-2-2) used as a query sequence along with three distinct strains of PCV2b-1A/1B (HQ713495), PCV2b-1C (JX535296) and PCV2a (DQ397521), recovered from USA as reference sequences were used for the recombination analysis.

b and c) The *cap* genes of XT-1-1-1 (PCV2b-1A/1B) and CS-1-1 (PCV2b-1C), recovered in our study and used as control query sequences along with reference sequences of PCV2b-1A/1B (FJ598044), PCV2b-1C (HM038017) and PCV2a (HM038034) for the two recombination analyses.

A molecular recombination software (SimPlot) was employed for the analyses. The y-axis indicates percentage of identity within a sliding window (200 bp wide) centered on the position plotted, with a step size between plots of 20 bp.



**Fig. S2** The capsid of the new cluster (YiY-3-2-2) has a surface combination from PCV2b-1A/1B before the breakpoint and PCV2b-1C after the breakpoint.

All the variable Cap amino acid residues in the alignment (a) were distributed on the capsid surface (green and blue in b). Before the breakpoint, the distinct amino acid residues (green in b) were located around Loops BC-decorated 5-fold axes (red in b) of the capsid. After the breakpoint, variable amino acid residues were labeled in blue (b) on the capsid surface. The two amino acid residues (<sup>230</sup>PL<sup>231</sup>) of Loop CT were displayed in

yellow on the surface (b).

Note: the last two amino acid (<sup>232</sup>NP<sup>233</sup>) of Loop CT in the cluster of traditional PCV2b were missed in the capsid structure model. In addition, the extra lysine (<sup>244</sup>K) of Loop CT in the cluster of the mutated PCV2b (PCV2b/1C) was also absent.