

## Supporting Information

### OR2C1 is a novel target binds heparin modulating sperm capacitation

Xiang Yuan<sup>1,†</sup>, Yihan Wang<sup>1,†</sup>, Malik Ahsan Ali<sup>1,2</sup>, Ziyue Qin<sup>1</sup>, Zhihua Guo<sup>1</sup>, Yan Zhang<sup>1</sup>, Ming Zhang<sup>1</sup>, Guangbin Zhou<sup>1</sup>, Jiandong Yang<sup>1</sup>, Lei Chen<sup>1</sup>, Linyuan Shen<sup>1</sup>, Li Zhu<sup>1</sup>, Changjun Zeng<sup>1,\*</sup>

<sup>1</sup> College of Animal Sciences and Technology and Farm Animal Genetic Resources Exploration and Innovation Key Laboratory of Sichuan Province, Sichuan Agricultural University, Chengdu, Sichuan, 611130, China;

<sup>2</sup> Department of Theriogenology, Riphah College of Veterinary Sciences, Lahore, 54000, Punjab, Pakistan;

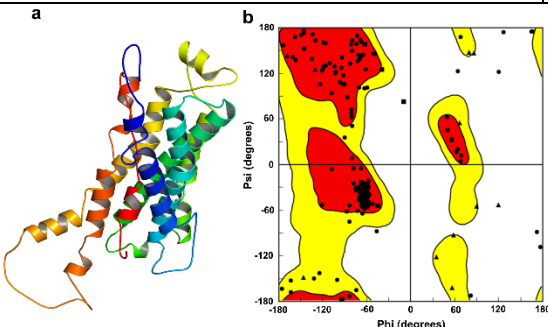
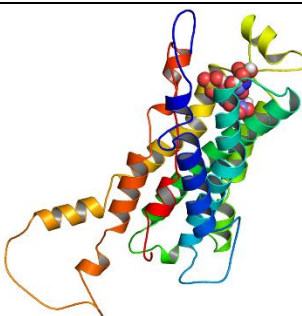
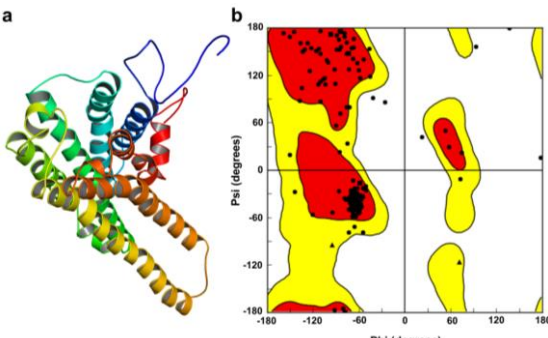
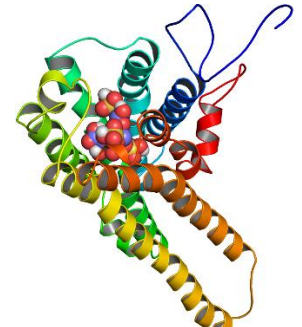
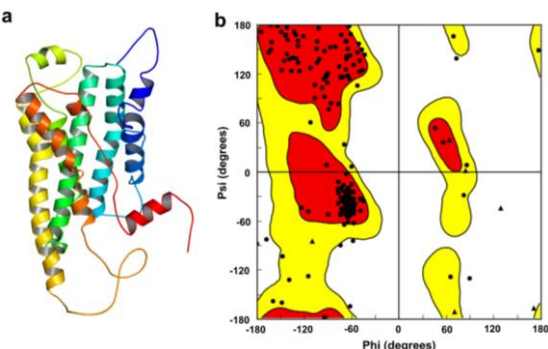
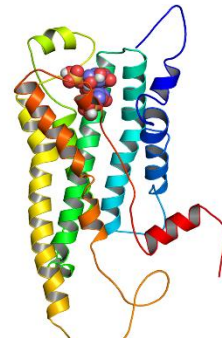
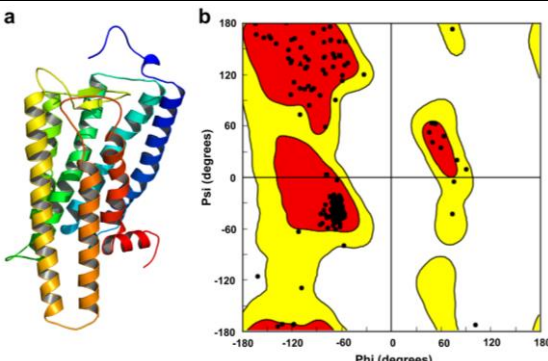
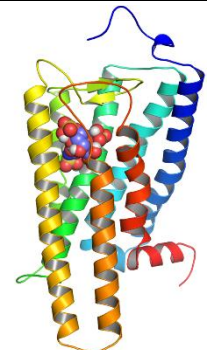
<sup>†</sup> These authors contributed equally to this work.


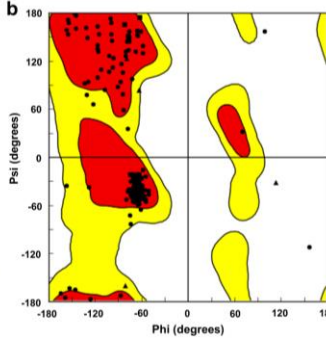
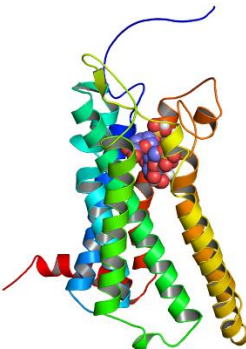

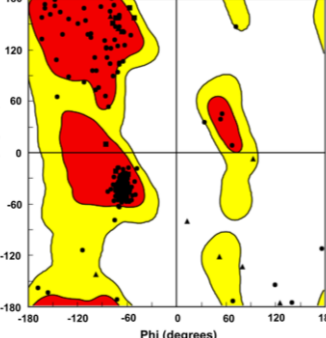
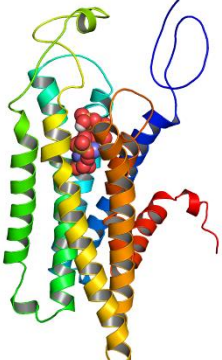
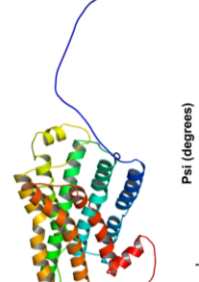
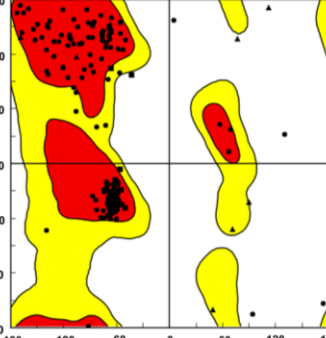
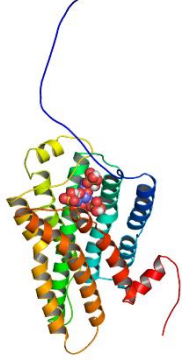
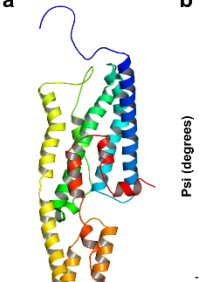
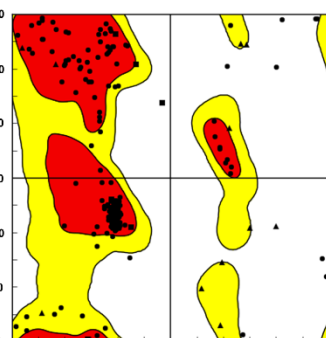
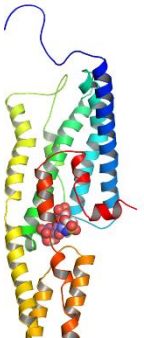
\* Correspondence: Changjun Zeng, [zengchj@sicau.edu.cn](mailto:zengchj@sicau.edu.cn)

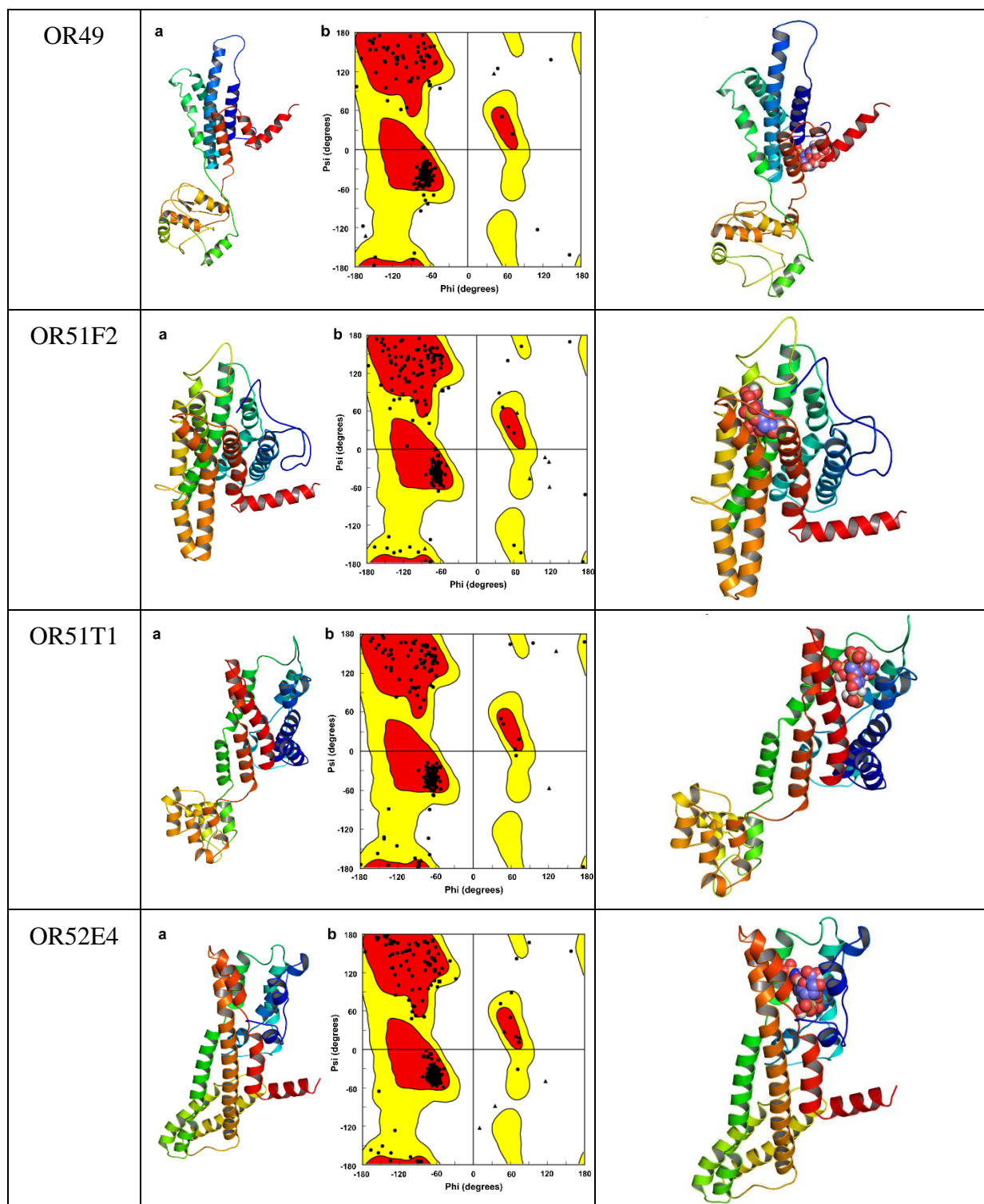
**Keywords:** Olfactory receptor; OR2C1; Heparin; Boar sperm; Capacitation

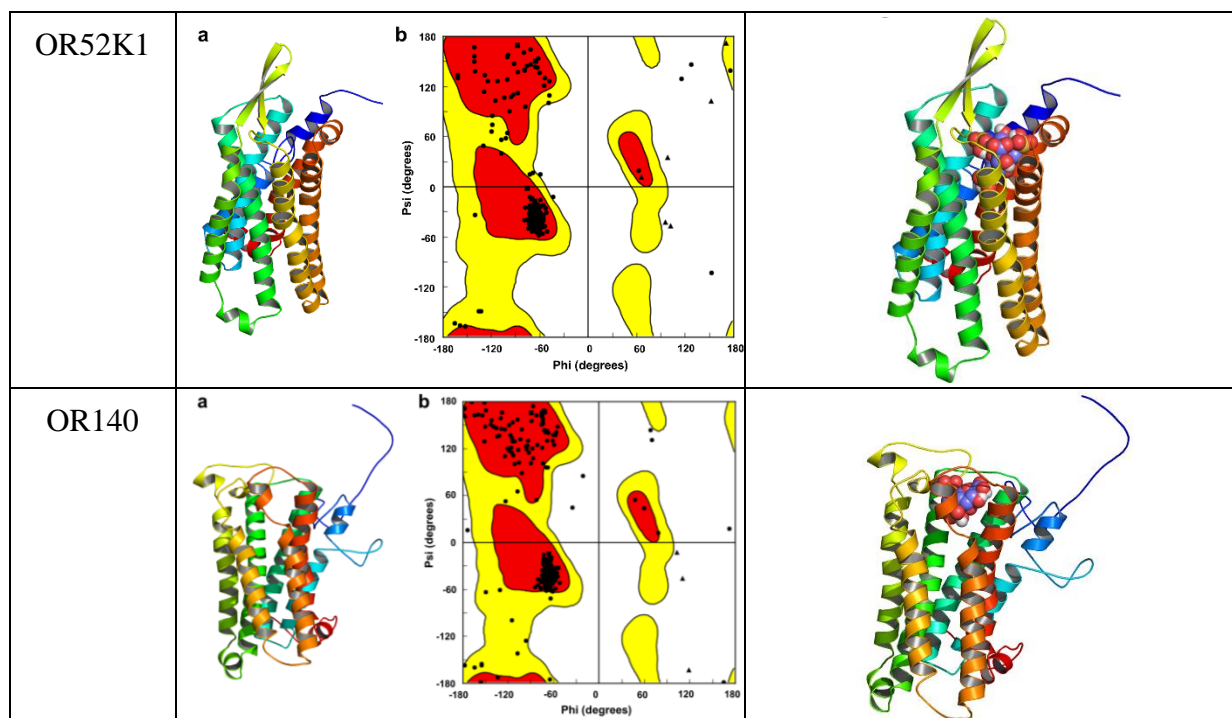
## Supplementary Tables

**Table S1:** The homology model (a), ramachandran plot (b) and docked structure of proteins with heparin.

Protein	Model and Ramachandran plot	Docked Structures
OR2C1		
OR1L8		
OR2M3		
OR4K13		

OR5V1	<p><b>a</b></p>  <p><b>b</b></p> 	
OR6S1	<p><b>a</b></p>  <p><b>b</b></p> 	
OR7A17	<p><b>a</b></p>  <p><b>b</b></p> 	
OR10Z1	<p><b>a</b></p>  <p><b>b</b></p> 	

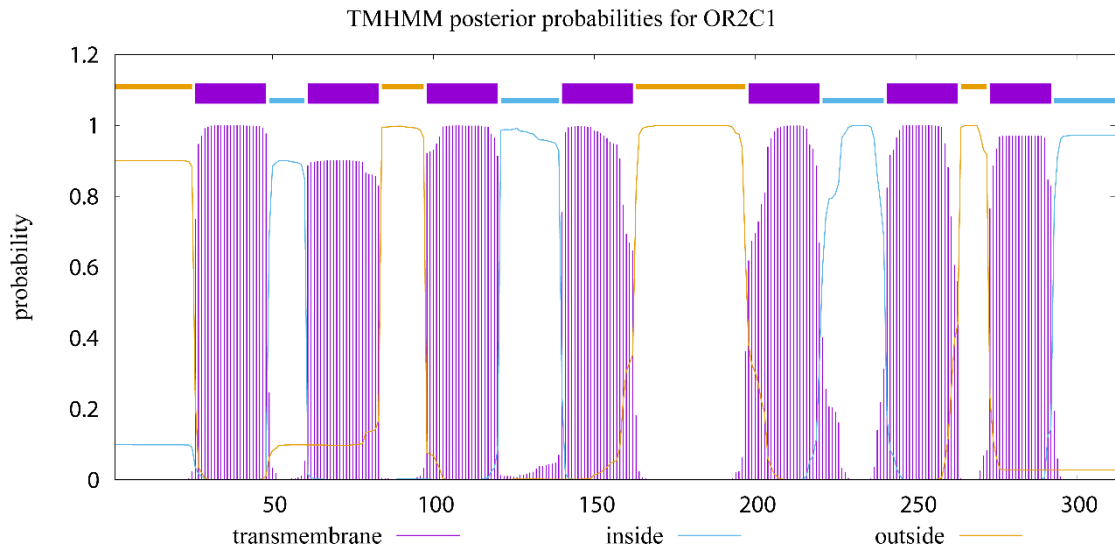




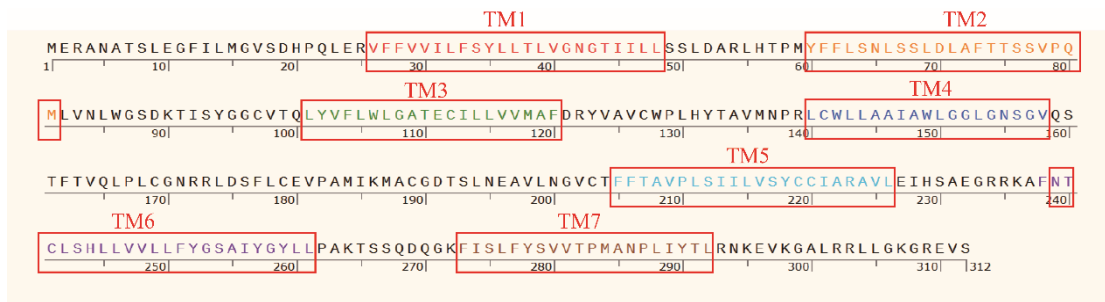
**Table S2:** Docking score and detailed indicators of olfactory receptor with heparin.

Protein	Docking Score with heparin (kcal/mol)	Intermolecular Energy (kcal/mol)	Electrostatic Energy (kcal/mol)	Internal Energy (kcal/mol)	Predicted <i>K<sub>i</sub></i> (μM)
OR2C1	-6.79	-12.16	-4.50	-12.12	10.60
OR1L8	-4.98	-10.35	-0.39	-9.46	222.27
OR2M3	-6.25	-11.62	-1.11	-9.29	26.32
OR4K13	-1.63	-7.00	-0.11	-9.99	64.04
OR5V1	-5.85	-7.22	-0.32	-10.27	44.09
OR6S1	-2.33	-7.70	-0.36	-10.41	19.49
OR7A17	-2.88	-8.25	-0.92	-10.66	7.76
OR10Z1	-4.36	-9.73	-2.78	-11.49	632.86
OR49	-5.53	-10.90	-4.36	-6.29	87.75
OR51F2	-4.81	-10.18	-0.70	-10.32	297.59
OR51T1	-6.23	-11.60	-4.84	-10.56	27.04
OR52E4	-4.22	-9.59	-0.79	-11.61	805.57
OR52K1	-5.86	-11.23	-1.46	-10.89	50.35
OR140	-4.39	-9.76	-3.85	-9.94	602.51

## Supplementary Figures



**Figure S1:** TMHMM posterior probabilities for OR2C1. Seven transmembrane regions are clearly indicated as purple bar.



**Figure S2:** The full residue sequence of OR2C1 protein, the different TM region is marked in the different colors and red rectangle box.