Table 1. P2YR Oligomers' Distribution and Function.

	Oligomer	Detection method	Cell	Time	Key structure	Dynamic regulation		Function	Reference
						increase	decrease		
Homo-oligomerization	$P2Y_1R$- $P2Y_1R$	FRET	HEK293 cells	2008	C-terminal and last four amino	$P2Y_1$ agonist (ADP, MsADP) (just +/- dimerization)	calcium chelator BAPTA-AM	internalization	(Choi, Simon, Tsim, & Barnard, 2008)
	$P2Y_2R$-$P2Y_2R$	Co-IP FRET	HEK293T/hematopoietic K562 cells neurons in cortex, cerebellum, Purkinje cells (rat)	2005					(Abe, Watanabe, Kuroda, Nakagawa, & Higashi, 2018; Kotevic, Kirschner, Porzig, & Baltensperger, 2005)
	$P2Y_4R$-$P2Y_4R$	Co-IP BN-PAGE	PC12 cell variant nnr5 (rat) Transfected SH-SY5Y cells synaptomes of rat cerebellar	2006	disulfide bonds			Dimer maybe functional unit	(D'Ambrosi, Iafrate, Saba, Rosa, & Volonte, 2007; D'Ambrosi et al., 2006)
	$P2Y_6R$-$P2Y_6R$	BN-PAGE	human SH-SY5Y cells PC12 (rat)	2007		Agonist stabilize complex			(D'Ambrosi et al., 2007)
	$P2Y_{12}R$-$P2Y_{12}R$	FRET X-Ray	HEK293T freshly isolated platelets(rat)	2006	helix V and two cholesterol molecules connection, disulfide bonds		Act-Met, DDT,	The ability to have activity	(Savi et al., 2006)
	$P2Y_{13}R$-$P2Y_{13}R$	FRET	HEK293T	2006					(Savi et al., 2006;

		Immunoblotting						Schicker et al., 2009)
	$P2Y_1R$-$P2Y_2R$	Co-IP FRET	bone marrow granulocytes myelocytic progenitors stromal cells (hematopoietic origin)	2016			Change the pharmacological properties	(Ribeiro-Filho et al., 2016)
	$P2Y_1R$-$P2Y_4R$	Co-IP FRET	bone marrow granulocytes myelocytic progenitors stromal cells (hematopoietic origin)	2016			Change the pharmacological properties	(Ribeiro-Filho et al., 2016)
	$P2Y_1R$-$P2Y_6R$	BN- and SDS-PAGE	Co-expressed PC12 cells	2007				(D'Ambrosi et al., 2007)
	$P2Y_1R$-$P2Y_{11}R$	FRET Co-IP	HEK293 1321N1 cells	2008	1.2MsADP 2.ATP	1. MRS2179	$P2Y_{11}R$ internalization; Result AMI.	(Ecke et al., 2008)
	$P2Y_1R$-$P2Y_{12}R$		HEK293T cells Human platelet membrane	2004	ADP/2MsADP	ARC69931MX	Maintain platelet balance	(Hardy, Jones, Mundell, & Poole, 2004)
	$P2Y_1R$-$P2Y_{13}R$	FRET Co-IP	tsA 201 cells	2009				(Schicker et al., 2009)
	$P2Y_2R$-$P2Y_4R$	BN- and SDS-PAGE	Co-expressed PC12 cells	2007				(D'Ambrosi et al., 2007)
	$P2Y_2R$-$P2Y_6R$	BN- and SDS-PAGE	Co-expressed PC12 cells	2007				(D'Ambrosi et al., 2007)
Hetero-oligomerization	$P2Y_2R$-$P2Y_{12}R$	FRET Co-IP	tsA 201 cells	2009				(Schicker et al., 2009)

	$P2Y_2R$-$P2Y_{13}R$	FRET Co-IP	tsA 201 cells	2009				(Schicker et al., 2009)
	$P2Y_4R$-$P2Y_6R$	BN- and SDS-PAGE	naive PC12 cells	2007				(D'Ambrosi et al., 2007)
	$P2Y_4R$-$P2Y_{11}R$	BN- and SDS-PAGE	Co-expressed PC12 cells	2007				(D'Ambrosi et al., 2007)
	$P2Y_6R$-$P2Y_{11}R$	BN- and SDS-PAGE	Co-expressed PC12 cells	2007				(D'Ambrosi et al., 2007)
	$P2Y_{12}R$-$P2Y_{13}R$	FRET Co-IP	tsA 201 cells	2009				(Schicker et al., 2009)
	$P2Y_1R$-A_1R	Co-IP BRET	HEK293T(recombinant receptor technology) Rat brain Human astroglial cell (multimeric complex)	2001	1.A1R agonist ADP 2. P2Y1R agonist	A1R antagonist	1.increase the affinity of agonist ADP to A_1R; 2. reduce A_1R signal transmission; 3. promote DDCPX affinity; 4. inhibit neurotransmitter release	(Nakata, Yoshioka, Kamiya, Tsuga, & Oyanagi, 2005; Tonazzini, Trincavelli, Montali, & Martini, 2008; Yoshioka, Hosoda, Kuroda, & Nakata, 2002; Yoshioka, Saitoh, & Nakata, 2001)
	$P2Y_1R$-$A_{2A}R$	Co-IP FRET	Human platelet 293T cells	2010				(Nakata, Suzuki, Namba, & Oyanagi, 2010; Suzuki, Obara, Moriya, Nakata, & Nakahata, 2011)
	$P2Y_1R$-M71R	Co-IP	HEK-293 cells	2007			1.Requirement and Increase M71	(Bush et al., 2007)

							expression in plasma membrane; 2. Change signal pathway	
	$P2Y_2R$-A_1R	Co-IP	Chinese hamster ovary cells HEK293T neurons, cerebellum Purkinje cells (rat) collecting duct of the kidney (mice)	2006		co-stimulation with A1R and $P2Y_2R$ agonists For A1R (-) For $P2Y_2R$(+)	attenuate A1R $G_{i/o}$ signaling and increase $P2Y_2R$ $G_{q/11}$ signaling, change affinity and pharmacological feature	(Namba, Suzuki, & Nakata, 2010; Safhill, 1975; Suzuki, Namba, Tsuga, & Nakata, 2006)
	$P2Y_2R$-A_{2A}	FRET Co-IP	tsA 201 cells	2009				(Schicker et al., 2009)
	$P2Y_2R$-B_2R	Co-IP FRET	CHO-K1 cells; HEK293 cells; 1321N1 cells; COS-7 cell	2015	Association to N-terminal glycosylation of B2R	UTP BK	Recruit and promote B2R fractionated into the raft fraction.	(Nakagawa, Takahashi, Matsuzaki, Kuroda, & Higashi, 2018; Yashima et al., 2015)
	$P2Y_2R$-M71R	Co-IP	Co-expressed HEK-293 cells	2007			1.membrane trafficking of M71; 2. Change signal pathway.	(Bush et al., 2007)
	$P2Y_6R$-AT_1	Co-IP BRET	HEK293 cell rat aortae	2016		$P2Y_6$ antagonist MRS2578	1.Regulate Ang II responses for AT1 2.Change signal transmission way	(Nishimura et al., 2016)
	$P2Y_{12}R$-$A_{2A}R$	Co-IP	Human platelet	2006				(Schicker et al., 2009)

		FRET	293T cells						
	$P2Y_{12}R$-PAR4	BRET	Platelet HeLa cells COS-7 cells Dami cells HEK293T cells	2014	(LGL 194-196) at the TM4 of PAR4	PAR4 agonist (AYPGKF)	1.calcium chelator BAPTA-AM; 2.$P2Y_{12}R$ antagonist MeSAMP	1. arrestin recruitment to endosomes; 2. $P2Y_{12}R$ internalization	(Khan, Li, Ibrahim, Smyth, & Woulfe, 2014; Smith, Li, Dores, & Trejo, 2017)
	$P2Y_{13}R$-A_1R	FRET Co-IP	tsA 201 cells	2009					(Schicker et al., 2009)
	$P2Y_{13}R$-A_{2A}	FRET Co-IP	tsA 201 cells	2009					(Schicker et al., 2009)
	$P2Y_1R$-$P2Y_{12}R$-A_{2A}	FRET	Transfected HEKT293 cell Transfected 1321N1 cell platelet	2005		ADP/2MsADP	1.ARC69931MX; 2. ZM241385	Maintain platelet balance	(Nakata et al., 2005; Schicker et al., 2009)