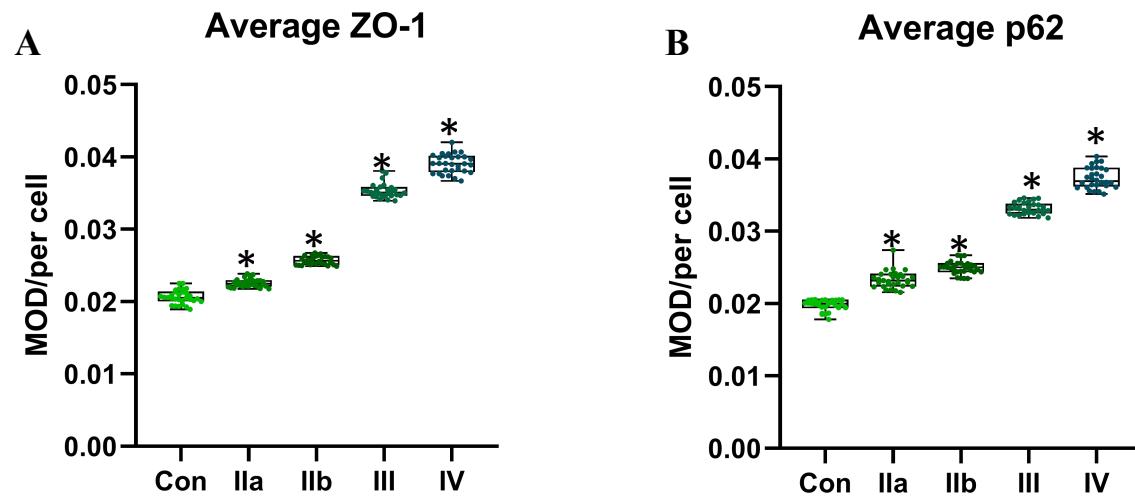
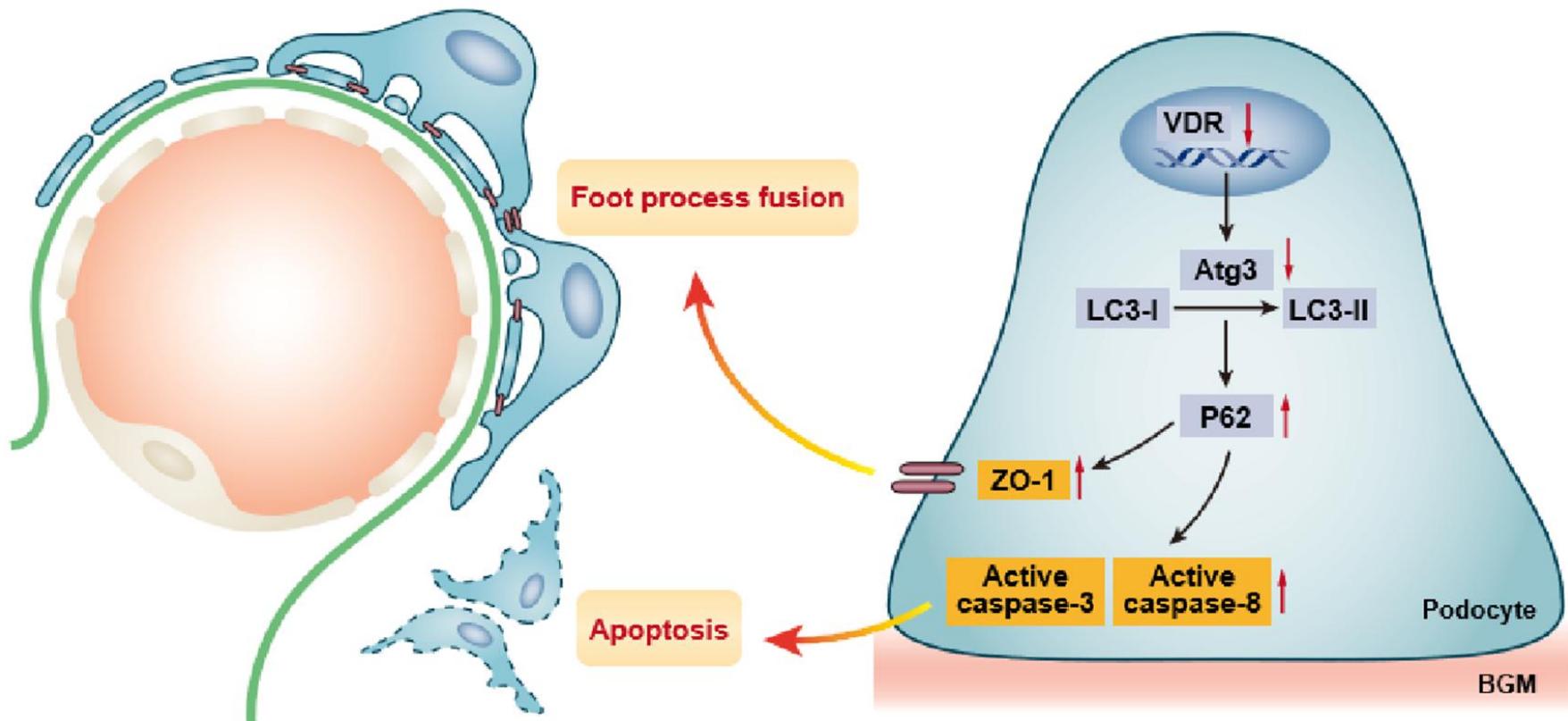


## Supplemental Materials



**Supplemental Figure 1. The average content of ZO-1 experienced an increasing trend in DN patients with the pathological progression from stage IIa to IV.** The ratio of IOD of ZO-1 (A) and p62 (B) to WT-1 count in the glomeruli of DN patients at different stages as indicated.  
#P < 0.05 vs Con.



**Supplemental Figure 2. Working model of VDR/Atg3 axis regulates SD-TJ transition in DN.** Under diabetic condition, VDR/Atg3 axis down-regulation inhibited LC3-I to LC3-II transition and blocked p62 mediated the autophagic degradation of ZO-1 in podocytes. At the same time, impaired autophagy flux resulted in p62 accumulation in podocyte, which further promoted podocyte injury via activation of caspase3 and caspase 8. In general, impairment of VDR/Atg3 axis in podocyte caused SD-TJ transition via p62-mediated autophagy pathway in DN.

**Supplemental Table 1. Clinical characteristics in 6 non-diabetic subjects and 24 diabetic patients.**

Stage	N	Age (Years old)	Duration (Years)	Urinary protein	urinary blood	occult	RBC/HPF	Albumin (g/L)	BP (mmHg)	24h Urinary protein (g/24h)	Scr (umol/L)	BUN (mmol/L)
Non- diabetic (N=6)	1	47	-	-	-	-	-	30.7	136/76	-	51	3.4
	2	54	-	-	-	-	-	39.6	140/90	-	78.5	4.35
	3	64	-	-	-	-	-	22.2	153/73	-	98	7.25
	4	39	-	-	-	-	-	17.4	101/62	-	45	3.03
	5	52	-	-	-	-	-	21.3	144/80	-	84	4.8
	6	52	-	-	-	-	-	21.1	150/100	-	69.5	5.5
IIa (N=6)	1	62	5	3+	-	-	-	33.8	150/90	2.771	54	3.5
	2	49	4	2+	-	-	-	43	131/83	1.92	64	4.59
	3	32	4	1+	-	-	-	49.2	135/78	1.08	71	5.58
	4	62	10	3+	±	-	1	34.9	155/92	4.76	67	6.46
	5	69	10	3+	-	-	-	35.5	163/78	2.53	120	11.83
	6	35	5	3+	-	-	-	39.3	125/70	2.02	55	3.16
IIb (N=6)	1	60	7	2+	-	-	-	44	138/80	2.205	88	8.6
	2	62	18	3+	-	-	-	28.5	141/74	5.65	77	6.84
	3	31	8	3+	2+	-	33.1	30.4	139/82	9.51	127	9.61
	4	48	10	3+	1+	-	9	22	133/85	3.558	61	8.69
	5	64	7	3+	-	-	-	28.3	145/93	3.252	75.2	53.9
	6	46	6	3+	+	-	5	30.7	140/80	14.1	128.1	5.39
III (N=6)	1	53	4	3+	+	-	6	24	130/80	8.6	97.4	4.39
	2	61	20	3+	+-	-	2	34.2	140/90	2.56	151	11.2
	3	63	12	2+	-	-	-	34.4	137/89	2.16	163	10.07
	4	54	10	3+	-	-	-	40.3	143/94	4.69	149	11.79

Stage	N	Age (Years old)	Duration (Years)	Urinary protein	urinary occult blood	RBC/HPF	Albumin (g/L)	BP (mmHg)	24h Urinary protein (g/24h)	Scr (umol/L)	BUN (mmol/L)
III (N=6)	5	50	9	2+	+	7.5	40.1	139/90	1.29	107	8.09
	6	44	15	2+	-	-	43.4	140/90	2.344	390	18.5
IV (N=6)	1	44	8	2+	-	-	43.4	142/89	2.344	390	18.5
	2	62	10	1+	2+	28	43.6	140/70	1.2	111	10.5
	3	54	6	3+	-	-	29.1	136/73	6.53	110	9.5
	4	58	6	3+	-	-	28.9	151/89	5.89	117	10.6
	5	58	6	3+	3+	23	29.8	136/90	5.89	103	9.1
	6	48	10	3+	2+	25	18.5	143/69	9.378	73	3.9

24 diabetic patients were diagnosed with DN Tervaert IIa, IIb, III, IV respectively. RBC/HPF, Red Blood Cells Per High-Power Field; BP; Scr, serum creatinine; BUN, Blood urea nitrogen; - indicates not determined.

**Supplemental Table 2: Biological parameters of rats in the control, STZ, and STZ+VDRA group, respectively, at the end of the 3-months follow-up.**

	Control	STZ	STZ + VDRA
Weight, g	500.51 ± 27.35	288.44 ± 13.65 <sup>#</sup>	301.72 ± 11.54 <sup>#</sup>
Serum creatinine, µmol/l	48.48 ± 3.27	51.08 ± 9.81	54.84 ± 10.56
Serum glucose, mg/dl	6.01 ± 0.55	27.63 ± 3.55 <sup>#</sup>	26.82 ± 3.39 <sup>#</sup>
Proteinuria, mg/24h	8.55 ± 0.67	53.86 ± 7.71	37.29 ± 4.25 <sup>#,*</sup>

#P<0.05 vs. control group, \*P<0.05 vs STZ group

**Supplemental Table 3: Biological parameters of rats in the db/m, db/db, and db/db + VDRA group, respectively, at the end of the 3-months follow-up.**

	db/m	db/db	db/db + VDRA
Weight, g	25.44 ± 2.37	59.66 ± 4.87 <sup>#</sup>	60.73 ± 4.79 <sup>#</sup>
Serum creatinine, µmol/l	31.46 ± 2.88	34.52 ± 3.13	35.99 ± 3.61
Serum glucose, mg/dl	8.38 ± 1.59	28.61 ± 3.93 <sup>#</sup>	27.55 ± 4.01 <sup>#</sup>
24h urinary albumin excretion, mg/l	2.13 ± 0.57	19.33 ± 3.54 <sup>#</sup>	8.44 ± 1.72 <sup>#,*</sup>

<sup>#</sup>P<0.05 vs. db/m group, <sup>\*</sup>P<0.05 vs db/db group