

Supplementary Information

New ST	<i>adk</i>	<i>fumC</i>	<i>gyrB</i>	<i>icd</i>	<i>mdh</i>	<i>purA</i>	<i>recA</i>
1	88	103	2	36	23	44	26
2	6	65	32	26	New 1	8	2
3	13	13	9	13	16	126	New 1
4	13	14	19	36	23	44	10
5	4	375	289	25	5	16	19
6	10	11	4	8	9	1	2
7	9	65	5	1	8	13	6
8	New 1	New 1	591	36	18	1	25
9	53	40	47	13	36	New 1	29
10	13	24	19	14	16	1	10
11	13	13	9	13	23	10	9
12	88	103	19	36	23	11	26
13	New 2	14	19	36	23	11	10
14	13	44	247	13	16	New 2	34
15	36	24	9	13	17	11	430
16	6	65	32	26	11	8	6
17	36	24	9	New 1	17	11	25
18	88	103	19	36	23	New 3	26
19	13	96	9	13	17	44	96
20	New 3	13	9	13	16	10	9
21	New 4	90	54	10	1	35	47
22	13	13	9	13	New 2	126	9
23	13	52	9	13	16	10	9
24	13	132	156	14	New 3	25	17
25	35	24	2	27	37	5	4
26	690	4	19	36	23	11	New 2
27	6	103	4	16	24	11	14
28	13	13	9	13	16	126	New 3
29	15	24	10	New 2	17	37	36
30	13	39	50	26	16	37	25

Supplemental Table 1. New sequence types isolated from canine urine in this study. Allele numbers of the known alleles of the new sequence types found in this study that could not be added to the Enterobase (<http://enterobase.warwick.ac.uk>) database due to cessation of acceptance of Sanger sequences to demonstrate new alleles and sequence types.

Primer Name	Primer Sequence (5' → 3')	Reference
papAF	ATGGCAGTGGTGTCTTTTGGTG	Johnson & Stell, 2000(S1)
papAR	CGTCCCACCATACGTGCTCTTC	Johnson & Stell, 2000
fyuAF	TGATTAACCCCGCGACGGGAA	Johnson & Stell, 2000
fyuAR	CGCAGTAGGCACGATGTTGTA	Johnson & Stell, 2000
ireAF	GATGACTCAGCCACGGGTAA	Rodriguez-Siek et al., 2005 (S2)
ireAR	CCAGGACTCACCTCACGAAT	Rodriguez-Siek et al., 2005
kpsMTIIF	GCGCATTTGCTGATACTGTTG	Johnson & Stell, 2000
kpsMTIIR	AGGTAGTTCAGACTCACACCT	Johnson & O'Bryan, 2004 (S3)
kpsMTIIR2	AGGCCGATGAACAGGGTGACCA	This paper
papCF	GTGGCAGTATGAGTAATGACCGTTA	Johnson & Stell, 2000
papCR	ATATCCTTTCTGCAGGGATGCAATA	Johnson & Stell, 2000
sfa/focDEF	CTCCGGAGAACTGGGTGCATCTTAC	Johnson & Stell, 2000
sfa/focDER	CGGAGGAGTAATTACAAACCTGGCA	Johnson & Stell, 2000
afa/draBCF	GGCAGAGGGCCGGCAACAGGC	Johnson & Stell, 2000
afa/draBCR	CCCGTAACGCGCCAGCATCTC	Johnson & Stell, 2000
iutAF	GGCTGGACATCATGGGAACTGG	Johnson & Stell, 2000
iutAR	CGTCGGGAACGGGTAGAATCG	Johnson & Stell, 2000

Supplemental Table 2. Primers used for virulence genotyping multiplex PCR

Parameter	Total Number with Data Available For Parameter	Patient or Isolate Characteristic	N (% of total N with data for parameter)	
STs with ≥10 isolates	295	372	64 (21.7)	
		12	19 (6.4)	
		73	19 (6.4)	
		127	12 (4.1)	
		131	12 (4.1)	
		297	11 (3.7)	
Most Frequent Breeds	292	Mixed Breed Dog	66 (22.6)	
		Labrador	42 (14.4)	
		Golden Retriever	18 (6.2)	
		German Shepherd Dog	12 (4.1)	
		Beagle	11 (3.8)	
		Boxer	9 (3.1)	
		Yorkshire Terrier	8 (2.7)	
		Pit Bull	8 (2.7)	
Age	290	Median (Interquartile Range) (years)	9 (5 – 12)	
		Range	3 mo – 17 yr	
Sex	283	Female	Spayed	219 (77.4)
			Intact	184
			Unknown Status	14
		Male	Unknown Status	21
			Neutered	64 (22.6)
			Intact	50
Unknown Status	8			
Practice Type	290	Referral	6	
History of UTI	259	Known History	170 (58.6)	
On Potentially Immunosuppressive Therapy	146	Total	114 (44.0)	
		Prednisone (unknown dose)	45 (30.8)	
		Oclacitinib	20 (13.7)	
		Chemotherapy	8 (3.4)	
		Cyclosporine	6 (4.1)	
		Dexamethasone	4 (2.7)	
		Budesonide	2 (1.4)	
		Corticosteroid + cyclosporine	1 (0.7)	
		Corticosteroid + chemotherapy	3 (2.1)	
On Antimicrobials at the Time of Urine Submission to Laboratory	156	Total	3 (2.1)	
		Amoxicillin	34 (21.8)	
		Amoxicillin – Clavulanic Acid	8 (5.1)	
		Enrofloxacin	8 (5.1)	
		Cefpodoxime	4 (2.6)	
		Metronidazole	4 (2.6)	
		Ampicillin	3 (1.9)	
		Fosfomycin	3 (1.9)	
		Trimethoprim-sulfa	2 (1.4)	
		Doxycycline	2 (1.4)	
		More than one drug	2 (1.4)	
		Total	3 (2.0)	
		Recent (within past month) History of Antimicrobials	166	Total
Amoxicillin – Clavulanic Acid	15 (9.0)			
Cefpodoxime	10 (6.0)			
Amoxicillin	7 (4.2)			
Antimicrobial Type Not Available	6 (3.6)			
Enrofloxacin	6 (3.6)			
Metronidazole	5 (3.0)			
Cephalexin	2 (1.2)			
Trimethoprim-Sulfa	2 (1.2)			

		Doxycycline	2 (1.2)
		Clindamycin	1 (0.6)
		Cefovecin	1 (0.6)
		Ciprofloxacin	1 (0.6)
		Ampicillin	1 (0.6)
		More than one drug	7 (4.2)
Neurologic Disease	161	Total	34 (21.1)
		Myelopathy and/or paraplegia (unspecified)	10 (6.2)
		Paraparesis, disease unknown	4 (2.5)
		Discospondylitis	4 (2.5)
		Intervertebral disk disease	4 (2.5)
		Seizures	2 (1.2)
		Brain Tumor (unspecified)	2 (1.2)
		Fibrocartilaginous embolism	1 (0.6)
		Spinal fracture	1 (0.6)
		Spinal mass (unspecified)	1 (0.6)
		Cranial aspergillosis	1 (0.6)
		Multiple Diseases	2 (1.3)
Urogenital Tract Disease	108	Total	43 (39.8)
		Polyuria	12 (11.1)
		Uroliths and/or nephroliths	6 (5.6)
		Chronic Kidney Disease	5 (4.6)
		Diabetes Mellitus	4 (3.7)
		Abnormal vulvar conformation	4 (3.7)
		Ectopic Ureter	3 (2.8)
		Bladder Mass	3 (2.8)
		Bladder thickened (ultrasound)	1 (0.9)
		Protein-losing nephropathy	1 (0.9)
		Preputial abnormality	1 (0.9)
		Urethral avulsion	1 (0.9)
		Urethral stent	1 (0.9)
		Enlarged kidney	1 (0.9)
Cancer	111	Total	27 (27.0)
		Bladder mass (TCC or unspecified)	12 (10.8)
		Brain Tumor (unspecified)	3 (2.7)
		Lymphosarcoma	3 (2.7)
		Osteosarcoma	3 (2.7)
		Thymoma	2 (1.8)
		Pulmonary (unspecified)	2 (1.8)
		Hepatocellular carcinoma	1 (0.9)
		Spinal Meningioma	1 (0.9)
		Multiple Myeloma	1 (0.9)
		Mast Cell Tumor	1 (0.9)
		Mammary carcinoma	1 (0.9)

Supplemental Table 3. Summary of patient and population characteristics of dogs with *E. coli* urinary tract infections included in this study (all sources combined). Some patients may fall into multiple sub-categories for patient characteristics, so total number in subgroups may exceed the total number of animals with that parameter.

	NDSU VDL	OSU VMC	IADDL Purdue	UCD VMTH	WADDL WSU
Total Number of Isolates	44	31	64	97	59
Frequency of ST372 (%)	20	12.5	34.4	17.5	20.4
Median VG Score (Interquartile range)	4 (2-5)	2.5 (1-5)	2 (1-4)	4 (2-5)	3 (1-4)
Number of ExPEC (%)	30 (66.7)	16 (50)	31 (48.4)	61(63)	32 (54.2)
Simpson's Diversity (1- <i>D</i>)	0.90	0.88	0.93	0.83	0.92
Dogs Examined by Specialty Service (%)	0	22 (71)	35 (54.7)	87 (90)	25 (42.3)
Patients with Previous Urine Submissions to Laboratory (%)	6 (13.3)	10 (32.3)	18 (28.1)	31 (32)	10 (16.9)
Known History of UTI (%)	15 (33.3)	10 (32.3)	22 (34.4)	40 (41.2)	27 (45.8)
Known to Be on Antibiotics at Submission (%)	2 (4.4)	9 (29)	8 (12.5)	13 (13.4)	2 (3.4)

Supplemental Table 4. Descriptive statistics by laboratory source of isolates



Supplemental Figure 1. Distribution of virulence-associated genes in the six most prevalent *E. coli* STs isolated from canine UTIs. Each row represents an individual isolate of the labeled ST (total n=138). Black fill = detection of that gene or ExPEC status.

Supplemental References

- S1. Johnson JR, Stell AL. 2000. Extended Virulence Genotypes of *Escherichia coli* Strains from Patients with Urosepsis in Relation to Phylogeny and Host Compromise. *J Infect Dis* 181:261–272.
- S2. Rodriguez-Siek KE, Giddings CW, Doetkott C, Johnson TJ, Fakhr MK, Nolan LK. 2005. Comparison of *Escherichia coli* isolates implicated in human urinary tract infection and avian colibacillosis. *Microbiology* 151:2097–2110.
- S3. Johnson JR, O'Bryan TT. 2004. Detection of the *Escherichia coli* Group 2 Polysaccharide Capsule Synthesis Gene *kpsM* by a Rapid and Specific PCR-Based Assay. *J Clin Microbiol* 42:1773–1776.