

1 Supplementary Table 1 Microorganisms identified by metagenomic sequencing of patients with idiopathic ONFH

Number	Suspected		Suspected background					<i>Mycobacterium tuberculosis</i> complex	Mycoplasma/Chlamydia
	pathogens number, abundance)	(reads relative abundance)	microorganisms number, abundance)	(reads relative abundance)	Fungus	Virus	Parasite		
1-RNA	<i>Pseudomonas aeruginosa</i> (9, 0.68)		<i>Ralstonia insidiosa</i> (505, 71.31)		None	None	None	None	None
1-DNA	<i>Burkholderia cenocepacia</i> (4, 1.75); <i>Pseudomonas aeruginosa</i> (3, 1.05)		<i>Ralstonia insidiosa</i> (28, 18)		None	None	None	None	None
2-RNA	<i>Enterococcus cecorum</i> (3, 8.46)		<i>Ralstonia insidiosa</i> (25, 31.96)		None	None	None	None	None
2-DNA	-		<i>Propionibacterium acnes</i> (25, 3.91); <i>Burkholderia ubonensis</i> (21, 8.46); <i>Staphylococcus epidermidis</i> (15, 2.45)		None	None	None	None	None
3-RNA	-		-		None	None	None	None	None

3-DNA	-	<i>Ralstonia</i> <i>insidiosa</i> (11, 30.38)	None	None	None	None	None
4-RNA	<i>Pseudomonas aeruginosa</i> (22, 11.96)	<i>Ralstonia</i> <i>insidiosa</i> (23, 18.43)	None	None	None	None	None
4-DNA	<i>Pseudomonas aeruginosa</i> (7, 1.46)	<i>Ralstonia</i> <i>insidiosa</i> (14, 9.48); <i>Delftia</i> <i>suruhataensis</i> (6, 4.14); <i>Propionibacterium acnes</i> (5, 3.52); <i>Burkholderia</i> <i>aubonensis</i> (4, 3.93)	None	None	None	None	None
5-RNA	<i>Pseudomonas aeruginosa</i> (9, 1.51)	-	None	None	None	None	None
5-DNA	-	<i>Ralstonia</i> <i>insidiosa</i> (4, 9.52)	None	None	None	None	None
6-RNA	<i>Pseudomonas putida</i> (4, 1.84)	<i>Propionibacterium acnes</i> (16, 11.28); <i>Ralstonia</i> <i>insidiosa</i> (10, 28.15);	None	None	None	None	None

		<i>Corynebacterium fermentans</i> (5, 3.96);					
		<i>Staphylococcus epidermidis</i> (3, 1.25)					
		<i>Xanthomonas campestris</i> (8, 8.23);					
		<i>Burkholderia bonensis</i> (6, 6.91);					
6-DNA	-	<i>Acinetobacter johnsonii</i> (6, 6.89);	None	None	None	None	None
		<i>Brevundimonas vesicularis</i> (6, 7.05);					
		<i>Asticcacaulis excentricus</i> (3, 4.21)					
		<i>Propionibacterium acnes</i> (17, 14.66);					
7-RNA	-	<i>Xanthomonas campestris</i> (7, 8.24);	None	None	None	None	None
		<i>Ralstonia insidiosa</i> (6, 6.63);					
		<i>Lawsonella clevelandensis</i> (4,					

			4.15)						
			<i>Xanthomonascampestris</i> (32,						
			25.74); <i>Ralstoniainsidiosa</i> (5,						
			4.39);						
7-DNA	<i>Pseudomonas putida</i>		<i>Brevundimonasvesicularis</i> (5,	None	None	None	None	None	None
	(10, 8.19)		4.37); <i>Burkholderiaubonensis</i>						
			(4, 2.33); <i>Staphylococcus</i>						
			<i>epidermidis</i> (3, 1.38)						
			<i>Xanthomonascampestris</i> (12,						
			9.96); <i>Burkholderiaubonensis</i>						
8-RNA	-		(4, 5.11);	None	None	None	None	None	None
			<i>Brevundimonasvesicularis</i> (3,						
			4.01)						
			<i>Xanthomonascampestris</i> (19,						
			30.08); <i>Staphylococcus</i>						
8-DNA	-		<i>epidermidis</i> (8, 18.43);	None	None	None	None	None	None
			<i>Ralstoniainsidiosa</i> (4, 2.69)						

9-RNA	-	<i>Xanthomonascampestris</i> (29, 45.81); <i>Ralstoniainsidiosa</i> (15, 29.62); <i>Brevundimonasvesicularis</i> (6, 10.58)	None	None	None	None	None
9-DNA	<i>Pseudomonas aeruginosa</i> (8, 9.61)	<i>Xanthomonascampestris</i> (36, 50.12); <i>Staphylococcus epidermidis</i> (13, 15.28)	None	None	None	None	None
10-RNA	-	<i>Ralstoniainsidiosa</i> (19, 22.05)	None	None	None	None	None
10-DNA	-	<i>Ralstoniainsidiosa</i> (33, 20.14)	None	None	None	None	None
11-RNA	<i>Pseudomonas putida</i> (12, 8.13)	<i>Burkholderiaubonensis</i> (14, 9.08); <i>Ralstoniainsidiosa</i> (12, 8.27); <i>Propionibacterium acnes</i> (8, 6.97)	None	None	None	None	None
11-DNA	-	<i>Ralstoniainsidiosa</i> (10, 5.31);	None	None	None	None	None

A		<i>Delftiatsuruhatensis</i> (6, 2.78)		e				
12-RNA	<i>Pseudomonas aeruginosa</i> (6, 15.98)	<i>Delftiatsuruhatensis</i> (12, 20.47); <i>Propionibacterium acnes</i> (7, 17.79)	None	Non e	None	None	None	None
12-DN	-	<i>Propionibacterium acnes</i> (15, 9.54)	None	Non e	None	None	None	None

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3 **Supplementary Table 2 Microorganisms identified by metagenomic sequencing of controls (without ONFH)**

Number	Suspected pathogens		Suspected background microorganisms		Fungus	Virus	Parasite	<i>Mycobacterium tuberculosis</i> complex	Mycoplasma/Chlamydia
	number, abundance)	(reads Relative abundance)	number, abundance)	(reads Relative abundance)					
1-RNA	-		<i>Propionibacterium acnes</i> (12, 30.21); <i>Ralstonia insidiosa</i> (9, 22.45); <i>Lawsonella clevelandensis</i> (5, 10.33)		None	Non e	None	None	None

1-DNA	-	<i>Ralstonia</i> <i>insidiosa</i> (7, 4.14); <i>Burkholderia</i> <i>aubonensis</i> (5, 3.52)	None	None	None	None	None
2-RNA	-	-	None	None	None	None	None
2-DNA	<i>Pseudomonas</i> <i>aeruginosa</i> (11, 20.49)	<i>Ralstonia</i> <i>insidiosa</i> (9, 15.47)	None	None	None	None	None
3-RNA	<i>Pseudomonas</i> <i>aeruginosa</i> (17, 9.51)	<i>Ralstonia</i> <i>insidiosa</i> (19, 10.62)	None	None	None	None	None
3-DNA	<i>Pseudomonas</i> <i>aeruginosa</i> (15, 17.83)	<i>Delftia</i> <i>suruhatensis</i> (16, 18.39); <i>Propionibacterium</i> <i>acnes</i> (15, 16.4); <i>Burkholderia</i> <i>aubonensis</i> (6, 2.6)	None	None	None	None	None
4-RNA	-	<i>Ralstonia</i> <i>insidiosa</i> (19, 18.01)	None	None	None	None	None
4-DNA	-	<i>Ralstonia</i> <i>insidiosa</i> (31, 22.13)	None	None	None	None	None

5-RNA	<i>Pseudomonas aeruginosa</i> (6, 7.26)	<i>Ralstonia insidiosa</i> (65, 89.04); <i>Burkholderia ubonensis</i> (7, 8.81)	None	None	None	None	None
5-DNA	<i>Burkholderia</i> (9, 10.48); <i>Pseudomonas aeruginosa</i> (7, 7.96)	<i>Ralstonia insidiosa</i> (39, 50.24)	None	None	None	None	None
6-RNA	-	<i>Xanthomonas campestris</i> (19, 23.57); <i>Brevundimonas vesicularis</i> (9, 11.03)	None	None	None	None	None
6-DNA	<i>Pseudomonas aeruginosa</i> (12, 40.29)	<i>Xanthomonas campestris</i> (16, 55.23); <i>Staphylococcus epidermidis</i> (9, 36.02)	None	None	None	None	None
7-RNA	-	-	None	None	None	None	None

7-DNA	-	<i>Ralstonia</i>	<i>insidiosa</i> (16, 12.83)	None	None	None	None	None
8-RNA	-		<i>Delftia</i> <i>suruhatensis</i> (12, 9.2); <i>Propionibacterium</i> <i>acnes</i> (7, 8.13)	None	None	None	None	None
8-DNA	<i>Pseudomonas</i> <i>aeruginosa</i> (19, 11.92)		<i>Burkholderia</i> <i>aubonensis</i> (14, 8.35); <i>Propionibacterium</i> <i>acnes</i> (11, 6.7)	None	None	None	None	None
9-RNA	<i>Pseudomonas</i> <i>putida</i> (15, 9.84)		<i>Ralstonia</i> <i>insidiosa</i> (19, 12.36); <i>Propionibacterium</i> <i>acnes</i> (15, 9.29)	None	None	None	None	None
9-DNA	-		<i>Ralstonia</i> <i>insidiosa</i> (16, 10.09)	None	None	None	None	None
10-RNA	-		<i>Xanthomonas</i> <i>campestris</i> (15); <i>Burkholderia</i> <i>aubonensis</i> (9)	None	None	None	None	None
10-DNA	<i>Pseudomonas</i> <i>aeruginosa</i> (12, 17.01)		<i>Staphylococcus</i> <i>epidermidis</i> (12, 16.87); <i>Ralstonia</i> <i>insidiosa</i>	None	None	None	None	None

		(7, 5.24)					
11-RNA	-	<i>Ralstonia</i> <i>insidiosa</i> (14, 34.79)	None	None	None	None	None
11-DN	-	<i>Propionibacterium</i> <i>acnes</i> (19, 7.62); <i>Burkholderia</i> <i>aubonensis</i> (12, 5.58)	None	None	None	None	None
12-RNA	<i>Pseudomonas</i> <i>putida</i> (12, 2.45)	<i>Ralstonia</i> <i>insidiosa</i> (17, 6.17); <i>Corynebacterium</i> <i>fermentans</i> (15, 5.56); <i>Staphylococcus</i> <i>epidermidis</i> (9, 2.83)	None	None	None	None	None
12-DN	-	<i>Burkholderia</i> <i>aubonensis</i> (11, 5.4); <i>Acinetobacter</i> <i>johnsonii</i> (9, 4.81); <i>Asticcacaulis</i> <i>excentricus</i> (6, 2.27)	None	None	None	None	None

6 **Supplementary Table 3 Comparisons of suspected pathogens and suspected background microorganisms in the OHFH and**
 7 **control groups**

		ONFH group		Control group		<i>P</i> ^a
		negative	positive	negative	positive	
Suspected pathogens	<i>Pseudomonas aeruginosa</i>	7	5	6	6	1.00
	<i>Burkholderiacenocepacia</i>	11	1	11	1	1.00
	<i>Enterococcus cecorum</i>	11	1	12	0	1.00
	<i>Pseudomonas putida</i>	9	3	10	2	1.00
Suspected background microorganisms	<i>Ralstonia insidiosa</i>	1	11	3	9	0.59
	<i>Propionibacterium acnes</i>	6	6	7	5	1.00
	<i>Burkholderia ubonensis</i>	6	6	5	7	1.00
	<i>Staphylococcus epidermidis</i>	7	5	8	3	0.67
	<i>Delftia suruhatensis</i>	9	3	10	2	1.00
	<i>Corynebacterium fermentans</i>	11	1	11	1	1.00
	<i>Xanthomonas campestris</i>	8	4	10	2	0.32
	<i>Acinetobacter johnsonii</i>	11	1	11	1	0.76
<i>Brevundimonas vesicularis</i>	8	4	11	1	0.32	

<i>Asticcacaulisexcentricus</i>	11	1	11	1	1.00
<i>Lawsonellaclelandensis</i>	11	1	11	1	1.00

8 ^a*P* values were determined using Fisher's exact test.

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