Diagnostic Reagents to Predict Risk of Preterm Birth

Healthy bebe™ Vaginal 5 Species Quantification Reagent (PB7500-100T)

Other reagents, classIII, for molecular diagnostics (N20020.03)

What is Preterm Birth?

Pregnancy → 14 weeks → 28 weeks → 40 weeks

Trimester 1 | **Trimester 2** | **Trimester 3**

Preterm birth refers to delivery before 37 weeks of gestation

The leading cause of neonatal mortality

Rising Preterm Birth Rates

2011: 6.0% → 2021: 9.1%

High Social Costs

Medical costs 12 times higher than normal deliveries

Multiple Risk Factors

Vaginal infections, premature rupture of membranes the length of the cervix, etc.

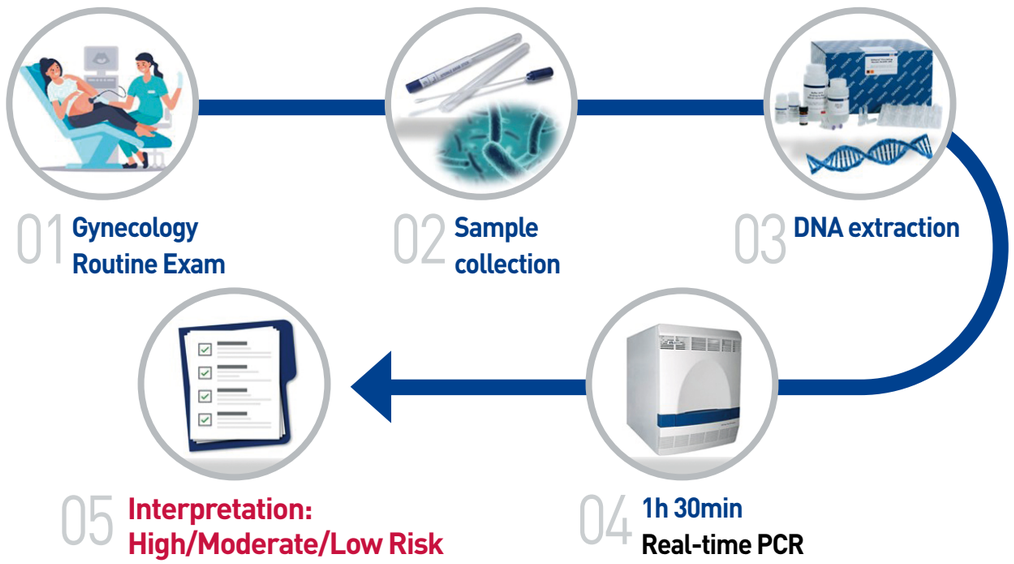
Need for Accurate Testing

Inaccuracies in existing tests

Key Features

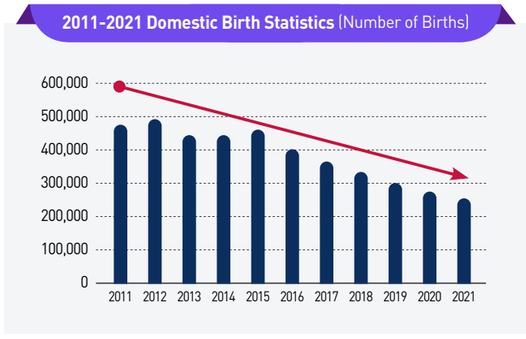
- **Contamination Prevention System** — Includes a UDG system to prevent contamination
- **Whole Process Control** — Monitor accurate clinical sample collection, DNA extraction, and even amplification
- **FAST TAT** — Real-time PCR results available in 90 minutes.
- **High capacity** — Capable of testing 36 mothers simultaneously
- **Clinical Performance** — AUC: 0.791, Clinical Sensitivity : 0.769

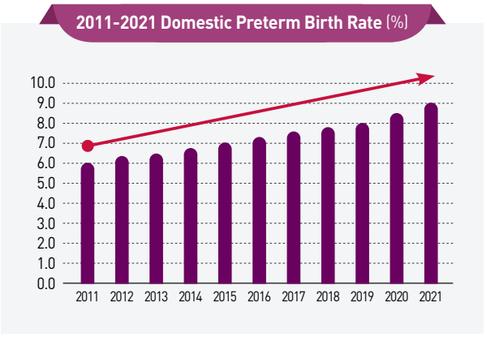
Testing Process



Trends

Contents	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Number of Preterm Births in Korea	28175	30379	28238	29087	30455	29414	27120	25222	24379	22911	23760
Total Births in Korea	471,265	484,550	436,455	435,435	438,420	406,243	357,771	326,822	302,676	272,337	260,562
Preterm Birth Rate in Korea (%)	6.0	6.3	6.5	6.7	6.9	7.2	7.6	7.7	8.1	8.4	9.1





Components

Category	Reagents Name	Detailed Description
Oligo Mix	4X Oligo Mix A set	Primer/Probe Mixture for 2 species of Microbe and Internal Control
	4X Oligo Mix B set	Primer/Probe Mixture for 3 species of Microbe and Internal Control
Control	Positive Control (PC)	Plasmid DNA Mixture for 5 species of Microbe and Internal Control
	Standard Curve Positive Control (SPC)	Plasmid DNA Mixture for 5 species of microbe
	Negative Control (NC)	RNase Free Water
Enzyme	2X PCR Master Mix	DNA polymerase Buffer & dNTPs, UracilDNA glycosylase (UDG)

Analytical Performance

Analytical Sensitivity

Target	Copy/μL
Lactobacillus crispatus	10 copies/rxn
Lactobacillus iners	10 copies/rxn
Ureaplasma urealyticum	10 copies/rxn
Ureaplasma parvum	10 copies/rxn
Gardnerella vaginalis	10 copies/rxn

Repeatability

Target	Concentration	CV (%)
Lactobacillus crispatus	High concentration (10000X LoD)	1.1
	Medium concentration (1000X LoD)	0.9
	Low concentration (10X LoD)	1.1
Lactobacillus iners	High concentration (10000X LoD)	1.0
	Medium concentration (1000X LoD)	1.1
	Low concentration (10X LoD)	0.6
Ureaplasma urealyticum	High concentration (10000X LoD)	0.9
	Medium concentration (1000X LoD)	0.8
	Low concentration (10X LoD)	0.7

Target	Concentration	CV (%)
Ureaplasma parvum	High concentration (10000X LoD)	0.9
	Medium concentration (1000X LoD)	0.6
	Low concentration (10X LoD)	1.4
Gardnerella vaginalis	High concentration (10000X LoD)	2.1
	Medium concentration (1000X LoD)	0.8
	Low concentration (10X LoD)	0.3

Cross Reaction

No.	Pathogen	Phylum	Source	Results (1ng/rxn)	
				4XOligo set A	4XOligo set B
1	Lactobacillus crispatus	Firmicutes	ATCC 33820	Detected	-
2	Lactobacillus iners	Firmicutes	ATCC 55195	Detected	-
3	Ureaplasma urealyticum	Firmicutes	ATCC 33699	-	Detected
4	Ureaplasma pavum	Firmicutes	ATCC 27815	-	Detected
5	Gardnerella vaginalis	Actinobacteria	ATCC14019	-	Detected
6	Bacteroides fragilis	Firmicutes	KACC 17870	-	-
7	Prevotella bivia	Bacteroidetes	JCM 14753	-	-
8	Prevotella amnii	Bacteroidetes	DSM 20514	-	-
9	Prevotella salivae	Bacteroidetes	DSM 15606	-	-
10	Lactobacillus gasseri	Firmicutes	AT3323	-	-
11	Lactobacillus jensenii	Firmicutes	KCTC 5194	-	-
12	Lactobacillus vaginalis	Firmicutes	ATCC 49540	-	-
13	Lactobacillus reuteri	Firmicutes	ATCC 23272	-	-
14	Lactobacillus acidophilus	Firmicutes	KCTC 3145	-	-
15	Lactobacillus coleohominis	Firmicutes	KCTC 21007	-	-
16	Prevotella disiens	Bacteroidetes	ATCC 29426	-	-
17	Staphylococcus epidermidis	Firmicutes	KCTC 13171	-	-
18	Staphylococcus saprophyticus subsp. saprophyticus	Firmicutes	KCTC 3345	-	-
19	Staphylococcus warneri	Firmicutes	ATCC 27836	-	-
20	Streptococcus intermedius	Firmicutes	ATCC 27335	-	-
21	Streptococcus gallinaceus	Firmicutes	KCTC 3876	-	-
22	Streptococcus oralis	Firmicutes	KCTC 5671	-	-
23	Streptococcus downei	Firmicutes	ATCC 33748	-	-
24	Anaerococcus vaginalis	Firmicutes	KCTC 15028	-	-
25	Anaerococcus lactolyticus	Firmicutes	ATCC 51172	-	-
26	Anaerococcus tetradius	Firmicutes	ATCC 35098	-	-
27	Atopobium vaginae	Actinobacteria	ATCC BAA-55	-	-
28	Actinomyces urogenitalis	Actinobacteria	KCTC 5117	-	-
29	Peptostreptococcus anaerobius	Firmicutes	ATCC 27337	-	-
30	Proteus mirabilis	Proteobacteria	ATCC 29906	-	-
31	Peptoniphilus duerdenii	Firmicutes	KCTC 15408	-	-
32	Dermabacter vaginalis	Actinobacteria	KCTC 39585	-	-
33	Enterobacter cloacae subsp. cloacae	Proteobacteria	ATCC 13047	-	-
34	Enterococcus faecalis	Firmicutes	ATCC 19433	-	-
35	Candida albicans	Yeast	ATCC 11006	-	-
36	Candida dubliniensis	Yeast	KCTC 17427	-	-
37	Candida glabrata	Yeast	ATCC 2001	-	-
38	Candida parapsilosis	Yeast	ATCC 22019	-	-
39	Candida tropicalis	Yeast	ATCC 750	-	-
40	Weissella cibaria	Firmicutes	KCTC 3807	-	-
41	Negative Control			-	-

Clinical Performance

Algoritm	Sensitivity / Specificity		Positive/Negative Predictive value		AUC
	Sensitivity	Specificity	Positive Predictive value	Negative Predictive value	
Algoritm 1[1)]	89.4%	40.1%	59.2%	80.6%	74.3%
Algoritm 2[2)]	65.2%	68.9%	67.3%	67.0%	71.5%
Algoritm 2[3)]	77.9%	57.0%	65.8%	77.5%	77.3%

1)&2) Analysis algorithm based on microbial quantification and distribution
3) Algorithm based on microbial quantification and BMI/WBC values