

MSc Thesis - Chapter 5: Figures and Tables

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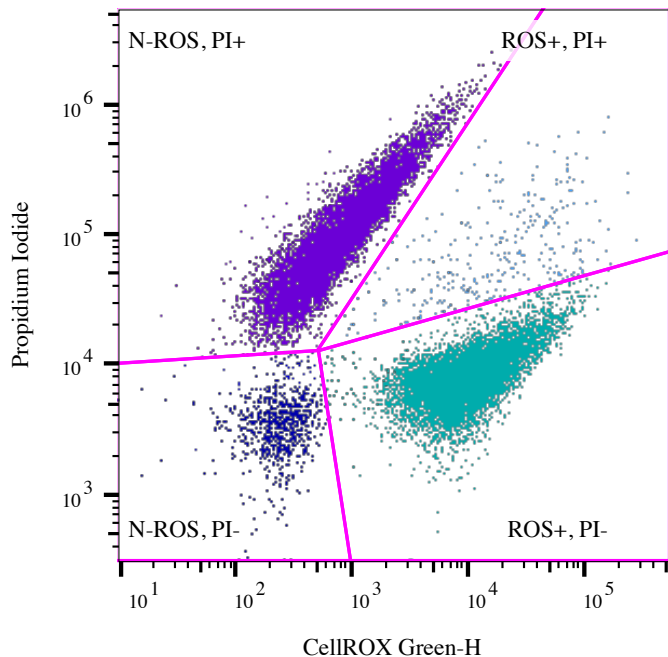


Figure 5.1 CellRox Green and propidium iodide fluorescence biplot of *B. animalis* control cells. N-ROS, PI- gate represents unoxidised cells with an intact membrane, N-ROS, PI+ gate represents unoxidised cells with a damaged membrane, ROS+, PI- gate represents oxidised cells with an intact membrane, ROS+, PI+ gate represents oxidised cells with a damaged membrane.

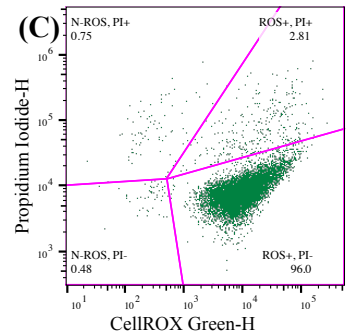
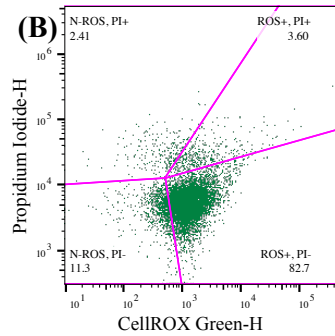
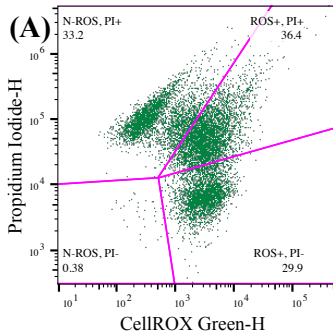
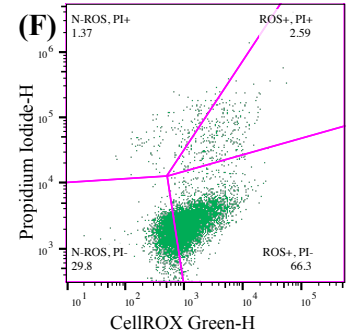
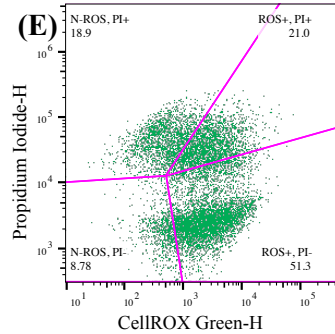
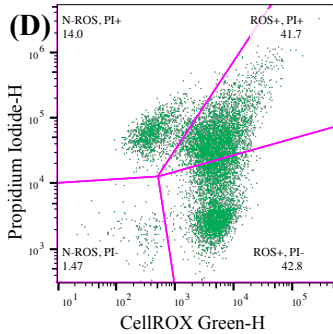
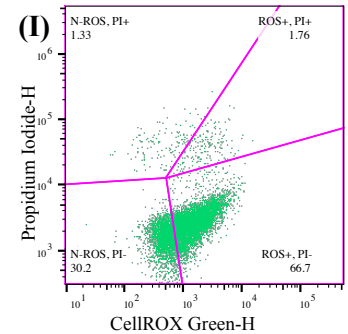
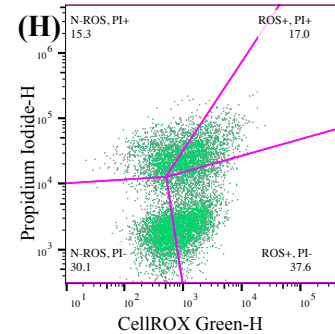
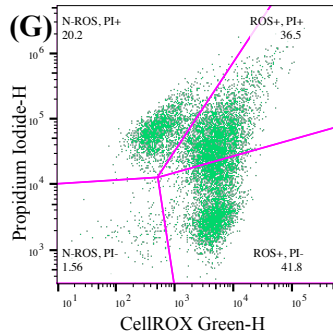
B. bifidum***B. breve******B. animalis*****Unadapted****Sublethal Treated****Lethal Treated**

Figure 5.2 CellRox Green and propidium iodide fluorescence biplots of unadapted, sublethal- and lethal H_2O_2 -treated *B. bifidum*, *B. breve* and *B. animalis* following exposure to the lethal H_2O_2 challenge (1 mM H_2O_2 ; 30 min). N-Ros, PI+: Unoxidised, membrane-damaged cell gate; N-Ros, PI-: Unoxidised, membrane-intact cell gate; ROS+, PI+: Oxidised, membrane-damaged cell gate; ROS+, PI-: Oxidised, membrane-intact cell gate.

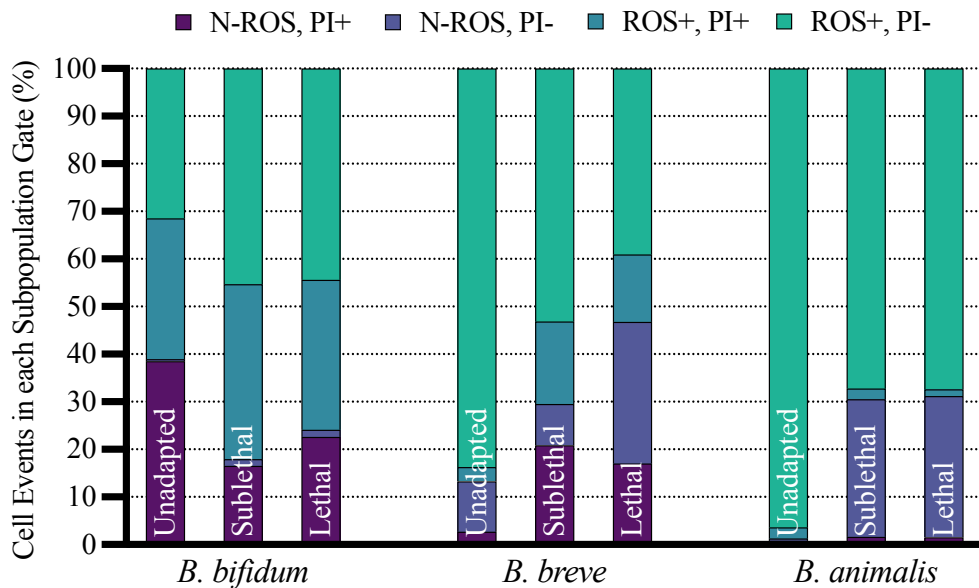


Figure 5.3 Relative proportions of unoxidised, membrane-damaged (N-ROS, PI+), unoxidised, membrane-intact (N-ROS, PI), oxidised, membrane-damaged (ROS+, PI+) and oxidised, membrane-intact (ROS+, PI-) subpopulations of unadapted, sublethal- and lethal H_2O_2 -treated *Bifidobacterium* species following exposure to the lethal H_2O_2 challenge (1 mM H_2O_2 ; 30 min).

Table 5.1 Analysis of variance showing the effect of bacterial species, stress adaptation and growth condition on the growth rate and the maximum population density of *Bifidobacterium* spp. ($n = 4$)

Source of Variation	DF	P-Value	
		Growth Rate	MPD ¹
Main Effects			
<i>Bifidobacterium</i> species (<i>B. bifidum</i> , <i>B. breve</i> , <i>B. animalis</i>)	2	< 0.001	< 0.001
Adaptation Treatment (Unadapted, Adapted)	1	-	< 0.001
Growth Condition (0, 0.1, 1 mM H ₂ O ₂)	2	< 0.001	< 0.001
Interactions			
Species x Growth Condition	4	< 0.001	< 0.001

¹MPD = maximum population density, as indicated by the OD^{36h}.

Table 5.2 Growth rates of unadapted and stress-adapted *Bifidobacterium* spp. during 36 hours of incubation under 0, 0.1 and 1 mM H₂O₂.¹

Growth Condition	Growth rate (OD units/h)					
	<i>B. bifidum</i>		<i>B. breve</i>		<i>B. animalis</i>	
	Unadapted	Stress Adapted	Unadapted	Stress Adapted	Unadapted	Stress Adapted
0 mM H ₂ O ₂	0.007 ^{Aa} ± 0.009	0.072 ^{Ab} ± 0.007	0.158 ^{Ac} ± 0.003	0.148 ^{Ac} ± 0.001	0.006 ^{Aa} ± 0.001	0.040 ^{Aab} ± 0.007
0.1 mM H ₂ O ₂	0.142 ^{Ba} ± 0.002	0.093 ^{Ab} ± 0.013	0.162 ^{ABa} ± 0.001	0.176 ^{Ba} ± 0.003	0.085 ^{Bb} ± 0.007	0.068 ^{Bb} ± 0.036
1 mM H ₂ O ₂	0.150 ^{Ba} ± 0.003	0.149 ^{Ba} ± 0.001	0.187 ^{Bb} ± 0.011	0.178 ^{Bab} ± 0.001	0.093 ^{Bc} ± 0.002	0.043 ^{Ad} ± 0.059

¹Values are mean ± standard deviation (*n* = 4).

Statistically significant differences (*P* < 0.05) between means are indicated by different small-caps letters within the same row, and different all-caps letters within the same column.

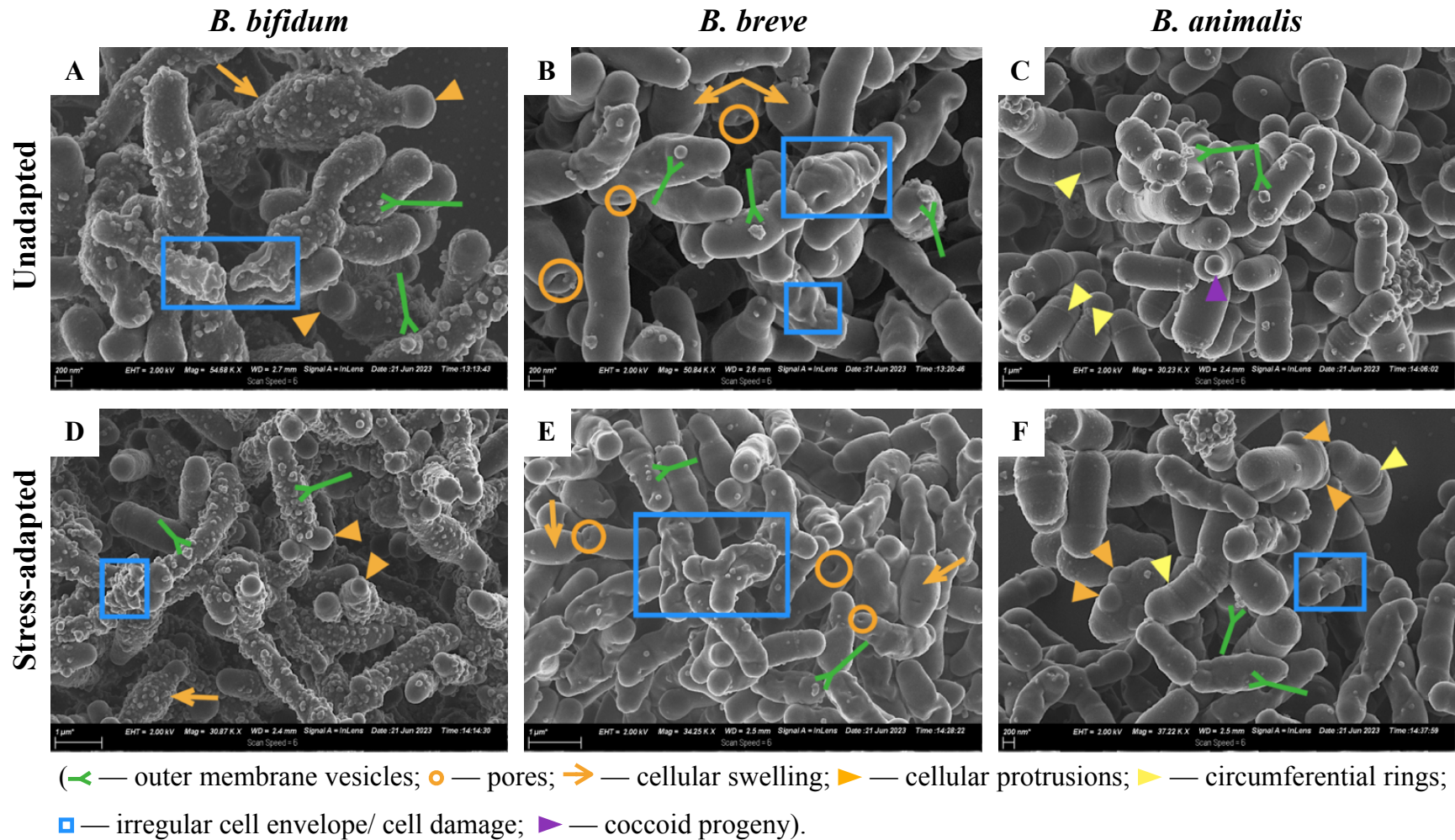
Table 5.3 MPD of unadapted and stress-adapted *Bifidobacterium* spp. during 36 hours of incubation under 0, 0.1 and 1 mM H₂O₂.¹

Growth Condition	Maximum Population Density (OD _{36h})					
	<i>B. bifidum</i>		<i>B. breve</i>		<i>B. animalis</i>	
	Unadapted	Stress Adapted	Unadapted	Stress Adapted	Unadapted	Stress Adapted
0 mM H ₂ O ₂	0.142 ^{Aa} ± 0.028	0.536 ^{Ab} ± 0.245	0.789 ^{Ac} ± 0.015	0.758 ^{Abc} ± 0.044	0.249 ^{Aa} ± 0.027	0.576 ^{Abc} ± 0.041
0.1 mM H ₂ O ₂	0.708 ^{Babd} ± 0.014	0.632 ^{Aad} ± 0.208	0.821 ^{Aac} ± 0.013	0.946 ^{Bbc} ± 0.046	0.370 ^{Ade} ± 0.043	0.551 ^{Ae} ± 0.055
1 mM H ₂ O ₂	0.717 ^{Bae} ± 0.016	0.729 ^{Aae} ± 0.048	0.947 ^{Aac} ± 0.012	1.145 ^{Bbc} ± 0.353	0.317 ^{Ad} ± 0.060	0.532 ^{Ade} ± 0.038

¹Values are mean ± standard deviation (*n* = 4).

Statistically significant differences (*P* < 0.05) between means are indicated by different small-caps letters within the same row, and different all-caps letters within the same column.

MPD = maximum population density, as indicated by the OD_{36h}.



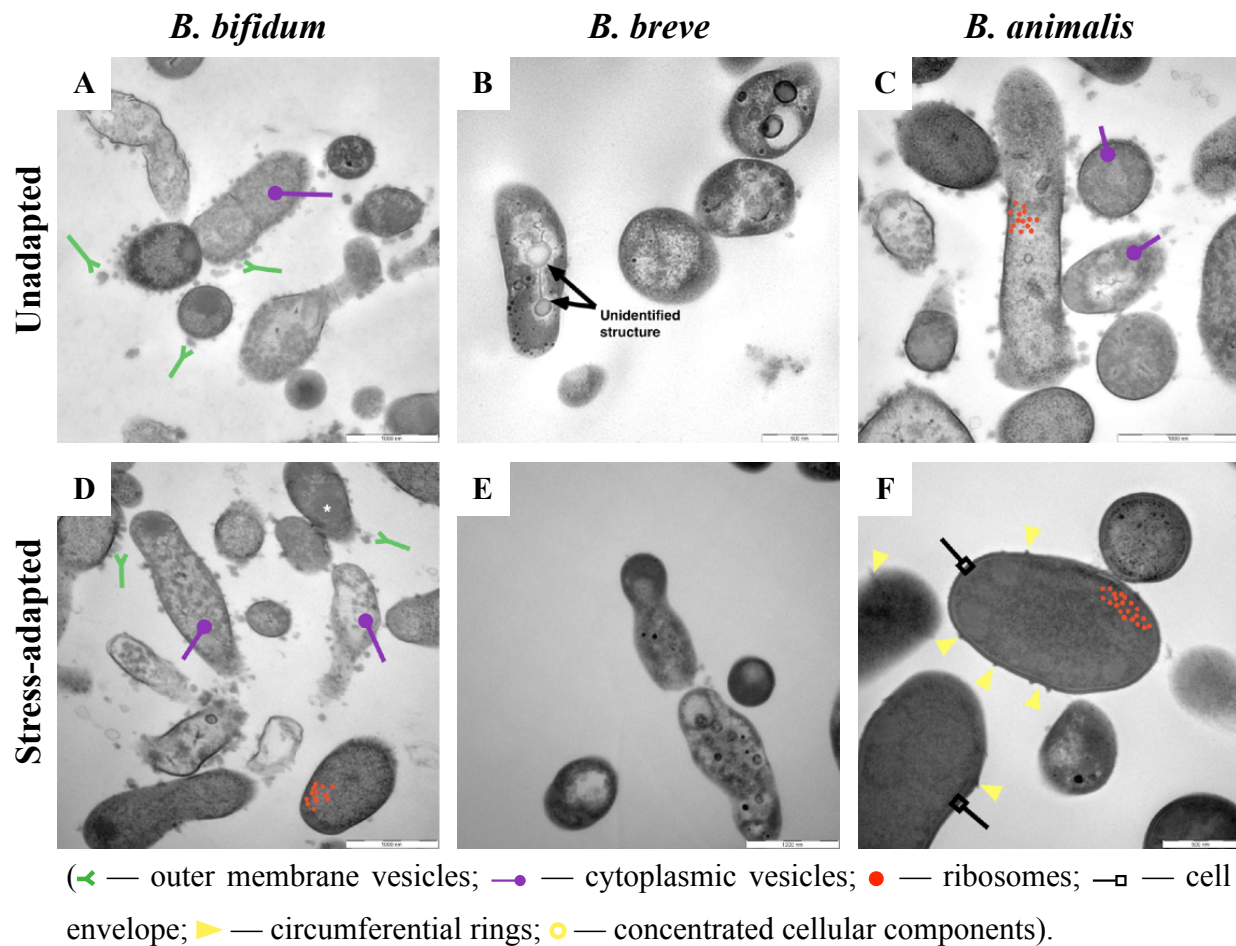


Figure 5.5 Transmission electron images of unadapted, control (A-F) and stress-adapted (G-L) *B. bifidum* (A, D, G, J), *B. breve* (B, E, H, K) and *B. animalis* (C, F, I, L) cells. Images represent respective bacterial species before (A-C and G-I) and after exposure (D-F and J-L) to lethal oxidative stress (1 mM H₂O₂; 30 min).