Juusola, M., and R.C. Hardi
The Journal of General Physiology. Volume 117, No. 1, January 2001. 3–25.

Pages 18 and 20

Due to an editorial error Figs. 9 and 10 were inadvertently switched, appearing with the incorrect legends. The figures and legends appear below correctly.
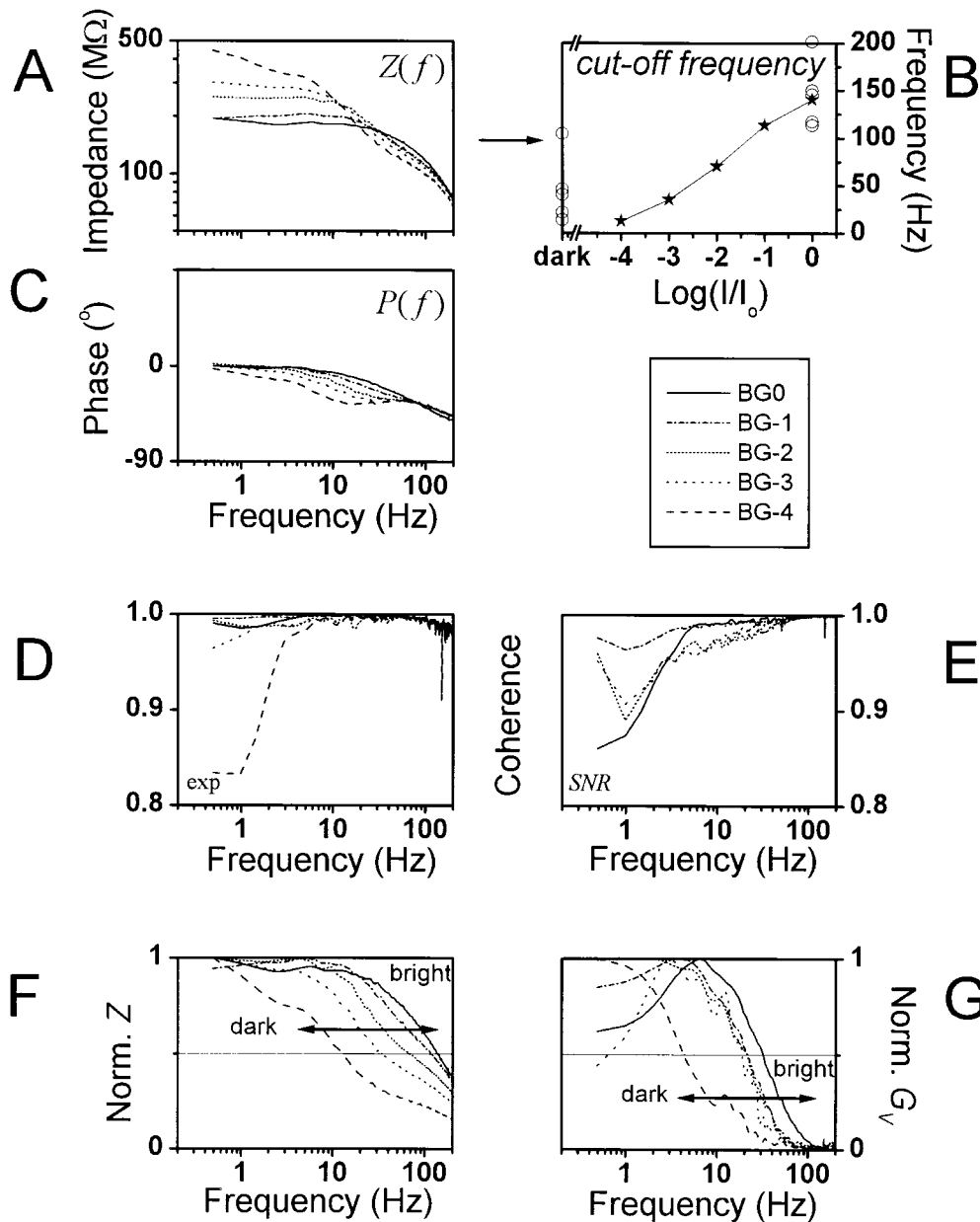

FIGURE 9. The photoreceptor membrane characteristics at different light adaptation levels. The photoreceptor impedance, Z, (f) calculated from the current injection and the resulting voltage responses, is reduced (A, gain), it is accelerated (B, 3-dB cutoff frequency) and it lags the stimulus less (C, phase) when it is shifted towards higher frequencies with increasing light adaptation. Regardless of the adapting background the membrane operates linearly over the studied frequency range (in D, $\gamma^2_{exp}(f)$ and in E, $\gamma^2_{SNR}(f)$; coherence close to unity). Both the normalized impedance (F) and the gain of the contrast-induced voltage responses (i.e., light response), (G) demonstrate a gradual shift of their bandwidth towards high frequencies. The cut-off frequency of the impedance is always much higher than that of the light responses in the same photoreceptor at the same adapting background; in this particular photoreceptor, 3.1, 1.9, 3.2, 5.1, and 4.2 times higher, when going from BG-4 to BG0.

Signal transfer

$|\tilde{\Gamma}_I(f)|$ versus $Z(f)$

C

----- $Z(f)$
——— $G_I(f)$
········· $G_V(f)$

1.0
0.0

BG0

G

----- $Z(f)$

——— $|\tilde{\Gamma}_I(f)|$

1.0
0.0

B

1.0
0.0

BG-2

F

1.0
0.0

A

1.0
0.0

1   10   100
Frequency (Hz)

BG-3

E

1.0
0.0

1   10   100
Frequency (Hz)

BG0

D

BG-2

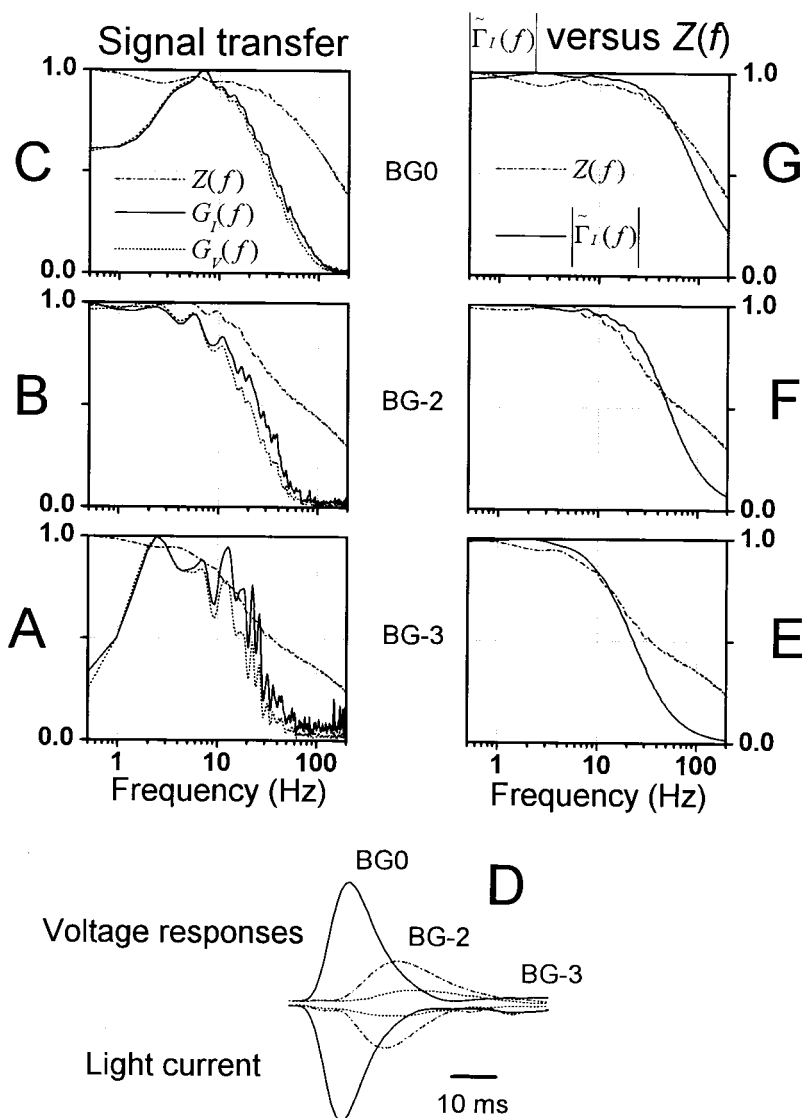BG-3

Voltage responses

Light current

10 ms

FIGURE 10. General comparison of the transduction signal and noise and membrane bandwidth at different adapting backgrounds. (A–C) The dynamics of the corresponding light current, voltage response, and membrane impedance displayed as their normalized gain. (A) Under dim conditions, the light current is noisy and the low passing membrane removes the high frequency noise, producing slow voltage responses to light contrasts. When the mean light intensity is increased, both the transduction cascade and photoreceptor membrane allows faster signaling leading to accelerated voltage responses (B and C). The corresponding impulse responses (D), calculated from the same data, show how the light current and voltage responses quicken with increasing mean light intensity, but the light current is always peaking before its respective voltage response. Because of the large membrane impedance under dim conditions, the small light currents can charge relatively large voltage responses. The responses are normalized by the maximum value of each series. (E–G) The transduction bump noise, $|\tilde{\Gamma}_I(f)|$, was calculated by deconvolving the photoreceptor membrane impedance, $Z(f)$, from the respective voltage bump noise, $|\tilde{\Gamma}_V(f)|$. From dim light conditions (E and F) to the bright adapting backgrounds (G) $|\tilde{\Gamma}_I(f)|$ shows a considerable overlap with the corresponding membrane impedance.