



Figure 3. Details of the linear (orange arrows) and cyclic (black arrows) electron flow pathways that produce NADPH and ATP. Proton movement is denoted by blue arrows. Four different cyclic pathways have been proposed and may operate in parallel: (1) NDH, PQ is reduced by NAD(P)H:PQ oxidoreductase; (2) FQR/PGR5, electrons are transferred from Fd to PQ via the FQR; (3) Nda2, a type 2 NAD(P)H:PQ oxidoreductase; (4) the Q_i (PQ reductase) site of the cytochrome b_6f complex is used to reduce PQ and may involve the Fd:NADP⁺ oxidoreductase (FNR). Other thylakoid components in the diagram include the ATP synthase, PSI, PSII, PQ (yellow hexagon), plastocyanin (PC), and light-harvesting complexes associated with PSII (LHCII).