Solutions

2.1

- Muscle lacks glucose-6-phosphatase, so G-6-P cannot become free glucose for export.

2.2

- Glucagon; liver only (no muscle receptors).

2.3

- 4 ATP + 2 GTP = 6 high-energy phosphates (plus 2 NADH).

3.1

- Hours 0–4 absorbed fuels; 4–12 hepatic glycogenolysis; 12–24 gluconeogenesis dominant; day 3+ ketones cover ~2/3 brain needs.
- 100 g ÷ ~5 g/h ≈ up to 24 h; strictly, glycogen alone ≈ 1 day of brain use (400 vs 480 kcal).
- Substrates: alanine (muscle), glycerol (fat), lactate (Cori).
- Ketones substitute for glucose → less gluconeogenesis → protein sparing.

3.2

- Muscle glycogen phosphorylase.
- No glycogen → no extra G-6-P flux → no pyruvate surge → no lactate.
- PFK-1 deficiency: glycogen BREAKS down but flux dies at the gate – also low lactate, but with phosphate intermediates accumulating.
- Advice: aerobic, low-intensity exercise (fat/fatty acids still usable); avoid sprints.