Design Surgery checklist

Use these questions in order. Diagnose before you redesign.

1 UNDERSTAND	2 DIAGNOSE	3 PRIORITISE	4 OPERATE

1	QUESTION	What biological question or hypothesis is the study trying to answer?
2	TREATMENT	What is deliberately manipulated, and what are its levels?
3	RESPONSE	What is measured, when, and by whom?
4	EXPERIMENTAL UNIT	What is the smallest unit that can independently receive treatment?
5	REPLICATION	How many independent treatment applications are there per level?
6	ALLOCATION	How are eligible units assigned? Could every unit have received either treatment?
7	COMPARISON	Is there a contemporaneous control or comparison that answers the question?
8	CONFOUNDING	What else differs systematically between treatments?
9	INDEPENDENCE	Are repeated observations, subsamples or grouped animals being mistaken for replicates?
10	INFERENCE	What conclusion does this design actually support - and what can it not establish?

TRIAGE	MINIMUM VIABLE REPAIR
Name the fatal flaw first. Separate it from features that are merely suboptimal or reduce precision.	Change as little as reasonably possible. Then ask: has the flaw been removed, or only moved somewhere else?

Catchphrase: What exactly received the treatment, and where does your n come from?