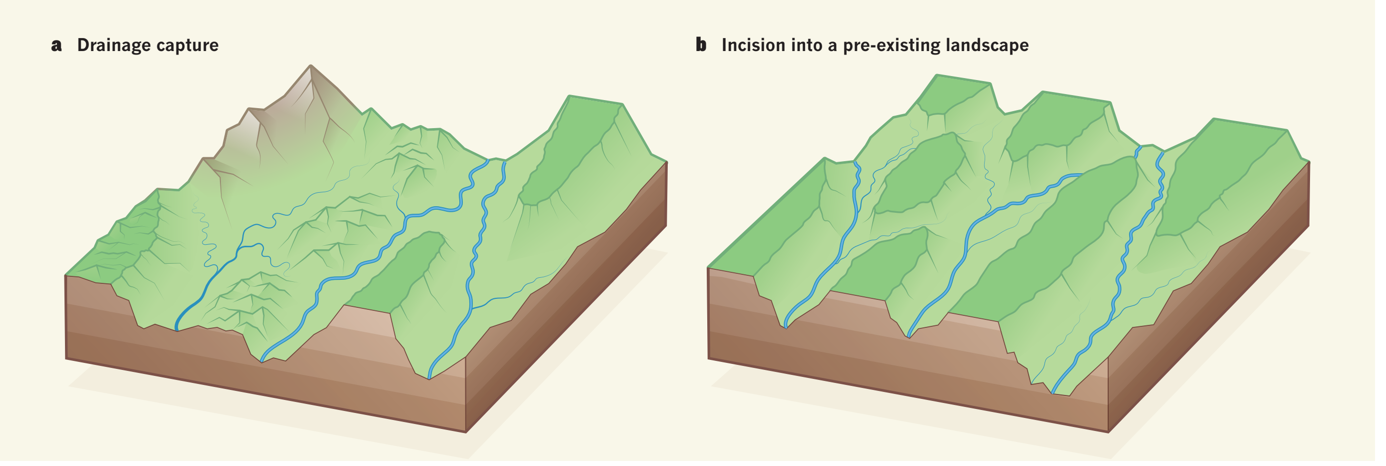

Figure 1 | Characteristics of low-gradient mountain terrain depend on the formation mechanism. Two mechanisms have been proposed for the formation of relatively flat surfaces in mountainous regions: drainage capture[2], which depends on the expansion and contraction of river networks during mountain building, and river incision into a pre-existing and slowly eroding low-gradient landscape[1]. **a**, Whipple *et al.*[3] report that surfaces formed by drainage capture will occur at different elevations, and become smoother at higher elevations. **b**, By contrast, surfaces formed by incision into a pre-existing landscape will be at approximately the same elevation, and will have low-gradient hill slopes and valleys that reflect the inherited topography.

deformation associated with the collision of the Indian continent with Asia[10]. Between these gorges are localized pockets of relatively flat surfaces, conventionally considered to be remnants of a part of the Tibetan Plateau that has been dissected by rivers for about 10 million years[4].

Yang *et al*. argued that the elevations of knickpoints (places at which steepening of the river channels occur) in this region are too scattered to reflect dissection of a common plateau, and that the relative gradients of river channels within and marginal to the flat surfaces imply the capture of one catchment by another. But Whipple and co-workers point out that the knickpoint elevations differ within a range of only about 500 metres, and that this could simply reflect the variability in elevations found on the original Tibetan Plateau. They also argue that evidence for capture of river networks is to be expected in the conventional dissection scenario, as a result of major rivers incising and expanding their valleys into the higher, pre-existing landscape.

Whipple *et al*. use numerical modelling to propose that surfaces formed solely by river capture should be characterized by: a random distribution in elevation (Fig. 1a); variable topographic relief that depends on the time elapsed since capture began; the presence of drainage divides at their margins that define the principally affected catchment area; and a reduction in relief at increased elevation (Fig. 1a), because the reduced erosional capacity of the victim's river system will cause a progressive increase in surface uplift in this region. The authors also propose that capture-formed surfaces will feature a remnant, high-relief rim at the upstream part of the catchment. However, such rims are unlikely to be ubiquitous in these surfaces, particularly if the initial reduction of erosion causes a positive feedback that drives capture across all of its bounding drainage divides. By contrast, remnant surfaces resulting from river incision into a pre-existing landscape should exhibit a relatively uniform elevation and relief that represents the topography of the original landscape (Fig. 1b).

Yang *et al*. reported that the observed variability of the scaling characteristics of river channels on low-gradient surfaces and channels marginal to those surfaces is another indicator of drainage capture. In their study, Whipple *et al*. spend little time considering this variability — presumably because these differences would also be a response to incision and expansion of valleys into a pre-existing surface.

The authors' list of diagnostic characteristics for surfaces generated by river capture compared with those generated by incision into a pre-existing low-gradient landscape presents a challenge to those who advocate the river-capture mechanism. An outstanding question is whether catchments that experience a reduction in drainage area have sufficient time to lower their hill-slope gradients before being fully captured and eradicated by the aggressively incising neighbour. Rates of erosion in the incised gorges of southeastern Tibet are of the order of 0.1–0.8 millimetres per year, but are much slower (about 0.02–0.03 mm yr^{-1}) on the remnant surfaces[4]. So the migration of drainage divides that is driven by trunk-stream incision must be substantially faster than the rate of lowering of hill slopes in the captured catchments.

Further testing is needed to determine the conditions under which captured catchments can lower their hill slopes sufficiently to mimic a low-gradient surface comparable to that resulting from incision into a pre-existing landscape. Whipple and colleagues' model of incision into a pre-existing Tibetan landscape also provides challenges, not least in working out how the surface remains relatively uniform across the region, despite the high degree of crustal strain advocated in some studies[2,10]. ■

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CORRECTION

The News & Views article 'Cancer genomics: spot the difference' by Noah D. Peyser and Jennifer R. Grandis (*Nature* **541,** 162–163; 2017) incorrectly stated that drugs that inhibit the activity of the protein KEAP1, which itself inhibits the transcription factor NRF2, could be used to combat activating mutations in the gene that encodes NRF2. Instead, it should have stated that this pathway could potentially be targeted for therapeutic use in certain oesophageal cancers if drugs are developed to inhibit mutant, activated NRF2.