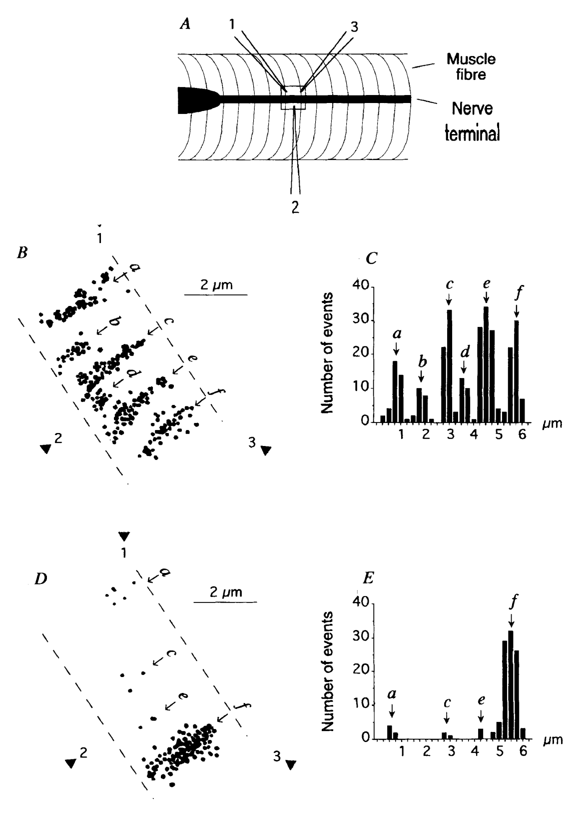

Spatial distribution of the active sites at the neuromuscular junction of frog. *A*, Scheme of experiment. *B*, Spontaneous release; each point corresponds to a single quantum response. Dashed lines indicate the edges of the nerve terminal, filled triangles (1, 2, 3) show disposition of extracellular electrodes. *C*, Histogram of distribution of active sites along the nerve terminal for spontaneous release. *D*, Nerve-evoked release (labelled as for *B*). The quantal content of evoked responses was decreased using a low Ca^{2+}/high Mg^{2+} solution. *E*, Correspondinng histogram of distribution of active /sites. Determination of the active sites of generation of single quantum responses was based on the model circuit of Del Castillo and Katz for extracellular recording at the neuromuscular junction[5] and has been described in detail elsewhere[2]. Further details are available directly from the authors.

across the entire width of the presynaptic terminal (*B* in the figure, zones *b* and *d*), and may correspond to morphologically identified, 'fragmented' active zones[3]. Densities of active sites were the same for all active zones, indicating that the level of spontaneous transmitter release is relatively uniform. The spatial distribution of the active sites of responses evoked by presynaptic action potentials had similar profiles to those spontaneously generated (*D*, *E* in the figure). Active sites of evoked release were grouped in active zones similar to those of spontaneous release and coincided with active zones of spontaneous release recorded in the same experiments ($n=7$; *B*, *C* in figure). In contrast to spontaneous release, the probability of evoked response generation was significantly different between active zones: in some it was high (*E* in the figure, zone *f*) whereas others were almost silent (zones *a*–*e*).

The present study provides direct functional evidence for the hypothesis that synaptic transmission results from the function of spatially separated active zones. The approach described here has substantial advantages over other techniques[5–7] and can be used to study fine mechanisms and modulation of transmitter release in single active zones.

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Volcanic risk for Rwandan refugees

SIR — In December 1994, the head of the international humanitarian association "Médecins du Monde", Dr Bernard Granjon, returned from the huge refugee camp just outside the Rwanda–Zaïre border, close to the town of Goma, on the southern foot of the large, active volcano Niragongo. Granjon was concerned about possible eruptive activity and sought my advice as a volcanologist who has visited and studied this particular volcano.

In my view, whatever the risk of eruption, there should be no evacuation of such a huge number of people as are living in this camp. I believe this because of long experience as a volcanological forecaster (in charge of major natural hazards for the French government (1981–86) and chairman of the national committee for eruptive hazards assessment since 1973).

My advice to ignore the risk from Niragongo is based on two factors: the number of people who could be victims of the potential lava flows; and the number of refugees who would die or contract serious diseases if one million people were to be evacuated from the camp, especially during the rainy season and in the prevailing cold temperatures due to the comparatively high altitudes. While in the camp, the refugees have tents, drinking water and latrines (the lack of these facilities in 1992 and 1993 resulted in cholera epidemics and countless deaths). Even if there were to be swift lava flows (which is by no means certain), transfer of refugees would result in a far greater number of victims than would result from any eruptive event.

As regards the strictly volcanological analysis of the present accumulation of molten lava in the Niragongo crater, the following factors should be considered.

(1) The observed accumulation of lava in the large sink-hole of the volcano will either stop for a long while, as it did from 1982 to 1994, or continue until it flows down the outer slopes of the volcano, either through one of several new fissures that its hydrostatic pressure would open in the sink-hole upper walls or by overflowing the lowest spots of the crater rim.

(2) The observed lava accumulation is 'lava lake' activity, characterized by a convective system of ascending, light, gas-rich and hot magma currents, followed by downwelling of degassed, somewhat cooled and thus denser lava. This phenomenon, which has probably occurred several times during recent geological times, has characterized Niragongo from 1928 to 1977.

(3) Whatever the present situation ('pond' or 'lake' activity), is the whole volcanic pile being pushed upwards by a rise of the whole magma body that feeds the twin volcanoes Niragongo and Nyamlagira, or does it result from the ascent of Niragongo's magma only?

(4) The observable features of prehistoric Niragongo activity show that a very violent outburst of high-pressure gases could occur, either hurling large volumes of pyroclastics upwards, to then fall with a parabolic trajectory, or propelling them horizontally (or obliquely) by a directed blast. Although such a catastrophe has occurred in the past, the likelihood of a recurrence is low, particularly because the present magma is an exceptionally fluid alkali basanite.

Whatever the risk of any one of these possible hazards, the number of victims of volcanic activity would be at least two to three orders of magnitude smaller than the number that would be claimed by a large-scale displacement of one million refugees.

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