TABLE 2 Antimicrobial activity against *S. aureus* obtained in the iterative process

Peptide mixture	IC ₅₀ ($\mu\text{g ml}^{-1}$)	Peptide mixture	IC ₅₀ ($\mu\text{g ml}^{-1}$)
(a)		(c)	
Ac-RRWXXX-NH ₂	216	Ac-RRWWCX-NH ₂	8.7
Ac-RRYXXX-NH ₂	239	Ac-RRWWX-NH ₂	9.9
Ac-RRRXXX-NH ₂	275	Ac-RRWWRX-NH ₂	9.9
Ac-RRHXXX-NH ₂	286	Ac-RRWWFX-NH ₂	12
Ac-RRCXXX-NH ₂	338	Ac-RRWWIX-NH ₂	14
Ac-RRXXX-NH₂	450	Ac-RRWWXX-NH₂	32
(b)		(d)	
Ac-RRWXXX-NH ₂	36	Ac-RRWWCR-NH ₂	3.4
Ac-RRWXXX-NH ₂	58	Ac-RRWWCW-NH ₂	4.1
Ac-RRWRXX-NH ₂	77	Ac-RRWWCV-NH ₂	4.9
Ac-RRWCXX-NH ₂	88	Ac-RRWWCY-NH ₂	5.4
Ac-RRWLXX-NH ₂	178	Ac-RRWWCK-NH ₂	5.5
Ac-RRWXXX-NH₂	273	Ac-RRWWCX-NH₂	8.7

The five lowest IC₅₀s obtained are illustrated for the peptide mixtures on defining: a, the third position (Ac-RRXXX-NH₂); b, the fourth position (Ac-RRWXXX-NH₂); c, the fifth position (Ac-RRWWCX-NH₂); and d, the sixth position (Ac-RRWWCO-NH₂). The IC₅₀ of the peptide mixture derived from the previous iterative step is in bold for comparison. The antimicrobial activity of each peptide mixture against *S. aureus* ATCC 29213 was determined as described earlier¹⁹. Briefly, in 96-well tissue culture plates, peptide mixtures were added to the bacterial suspension ($1-5 \times 10^5$ colony-forming units ml⁻¹) at concentrations derived from serial twofold dilutions ranging from 1.5 mg ml⁻¹ to 2.9 $\mu\text{g ml}^{-1}$. The plates were incubated overnight at 37 °C, and the growth determined at each concentration by the optical density at 620 nm. The relative per cent of growth found for each set of peptide mixtures was consistent in three separate determinations. The IC₅₀s were then calculated using the software program GRAPHPAD (ISI).

TABLE 3 Antimicrobial activity of Ac-RRWWCO-NH₂ against *S. aureus*

Sequence	MIC ($\mu\text{g ml}^{-1}$)	Sequence	MIC ($\mu\text{g ml}^{-1}$)
Ac-RRWWCR-NH ₂	3.2-6.5	Ac-RRWWCA-NH ₂	9-18
Ac-RRWWCV-NH ₂	3.8-7.7	Ac-RRWWCP-NH ₂	10-19
Ac-RRWWCW-NH ₂	4.5-9.0	Ac-RRWWCM-NH ₂	14-27
Ac-RRWWCY-NH ₂	4.7-9.5	Ac-RRWWCL-NH ₂	14-27
Ac-RRWWCK-NH ₂	4.8-9.6	Ac-RRWWCI-NH ₂	17-34
Ac-RRWWCT-NH ₂	4.9-10	Ac-RRWWCF-NH ₂	17-34
Ac-RRWWCH-NH ₂	5.5-11	Ac-RRWWCC-NH ₂	19-38
Ac-RRWWCQ-NH ₂	6-12	Magainin-II-NH₂	32-64
Ac-RRWWCS-NH ₂	7-14	Ac-RRWWCE-NH ₂	>250
Ac-RRWWCX-NH₂	7-14	Ac-RRWWCG-NH ₂	>500
Ac-RRWWCN-NH ₂	8-16	Ac-RRWWCD-NH ₂	>1,000

The MICs for the 20 peptides in which the sixth position is defined (Ac-RRWWCO-NH₂) are shown. The MIC is defined as the lowest concentration of peptide at which no growth is detected after 21 h incubation at 37 °C. The MICs of the previous peptide mixture and magainin-II are bold for comparison.

such as one composed entirely of D-amino acids, have been prepared which in total permit the systematic screening of hundreds of millions of peptides. A fundamental feature of SPCLs is that free peptides can be generated and used in solution in virtually all existing assay systems at a concentration of each peptide most applicable to the assay. This approach has also been successfully used in radio-receptor assays (opioid peptides) and plaque inhibition assays (human immunodeficiency virus (HIV-1) and herpes simplex virus (HSV)). SPCLs, as described, greatly aid all areas of drug discovery and research involving peptides. □

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ERRATUM

Ancient oceans, ice sheets and the hydrological cycle on Mars

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IN this Article in the 15 August 1991 issue, an error in the *Nature* office led to the omission of a line from Table 3. In addition, some corrections noted by the authors were not made before publication. Corrected versions of the relevant passages appear below and in reprints.

TABLE 3 Possible sources of CO₂ related to catastrophic outflow and ocean formation on Mars

Source	CO ₂ partial pressure (mbar)
North polar cap	~20
Massive volcanism	~100
Adsorbed on regolith: ocean basin	≤100
land	≤350
Groundwater	≤1,300
CO ₂ clathrate	≤4,000

Fluvial history

In first paragraph:

The very high infiltration capacities of common martian surface rocks (lava flows and impact-brecciated regolith) would allow subsurface aquifers to be replenished easily, so that head differentials could be sustained and drive prolonged groundwater flow. The resulting sapping³¹ would then produce the observed pattern of structurally controlled, low-density valley networks²⁴.

Although Noachian valleys are consistent with atmospheric

water cycling, including precipitation, direct evidence for the associated oceanic sink would have been removed by subsequent erosion and deposition.

In final paragraph:

The time required to produce the assemblage of postulated martian glacial features formed by the Austral ice sheet is estimated from terrestrial rates to be 10^5 to 2×10^7 years.

Formation and dissipation of oceans

The less-common post-Noachian martian valley networks and widespread glacial features were formed at approximately the same time as subsurface water was catastrophically released to form the outflow channels. An explanation of their origin is suggested by the observed association of the largest outflow channels with great fracture zones³⁷ extending from the Tharsis bulge (Fig. 1). The fractures, it is suggested, served as immense flow conduits, the Memnonia Fossae conducting the flow west from Tharsis to Mangala Vallis³⁸, and the Valles Marineris system and parallel fractures conveying the flow eastward to Kasei and Maja Valles as well as to the channels of the Chryse trough (the Shalbatana, Simud, Tiu and Area valleys).

In third paragraph:

Sudden catastrophic discharges of water, forming outflow channels and chaotic terrain, could occur where the permafrost cap thinned to some critical threshold thickness (on average the melting geotherm in Tharsis would rise from a depth of 3 km to 1.5 km) or where fractures associated with magmatic intrusions propagated through the ground-water zone to the surface.

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