

sophisticated ‘chemogenetic’ tools, they demonstrated that inhibition of CRF neurons in the BNST suppressed binge drinking and anxiety-like behaviours. Conversely, excitation of CRF neurons blocked the inhibitory effects of Y1R activation on binge drinking.

Pleil and colleagues’ work identifies the BNST as a key neuroanatomical hub in which NPY and CRF interact to regulate binge drinking. The findings show that alcohol can induce changes in NPY signalling that might protect against the development of binge patterns of drinking, suggesting that shifts in the balance of power between NPY and CRF might change an individual’s vulnerability to bingeing cycles. Moreover, medications that shift this balance in favour of NPY could be a good approach to treating binge drinking.

Are NPY and GABA co-released from the same neurons, and precisely how does Y1R activation increase GABA<sub>A</sub> function in CRF neurons? An understanding of these processes might help to expose the molecular mechanisms that regulate synaptic plasticity in the BNST and beyond. The authors’ findings also raise the intriguing issue of whether NPY–CRF interactions in the BNST are homeostatic, such that CRF also influences NPY signalling. If so,

it might be that changes in CRF activity can in turn suppress NPY activity to precipitate the binge–drinking cycle. Finally, CRF and NPY are thought to have key roles in regulating mood. It is therefore tempting to speculate that NPY–CRF interactions can influence the depression and anxiety that often accompany alcohol-use disorders. ■

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## SOLAR SYSTEM

# An incredible likeness of being

**Earth and the Moon share many puzzling chemical similarities. New analyses show that the last planet-sized body to hit Earth could have been similar enough to Earth to yield a Moon with an Earth-like composition. SEE LETTER P.212**

ROBIN M. CANUP

Some 4.5 billion years ago, our planet grew through a series of violent collisions with other planet-sized bodies, the last of which is thought to have produced the Moon. The impact of a roughly Mars-sized body with Earth can account for the Moon’s mass and unusually small iron core, as well as Earth’s rapid early spin rate, but it creates a Moon derived mainly from the impacting planet rather than from Earth<sup>1</sup>. It has been thought, mainly on the basis of the observed differences between Earth and Mars, that the impactor’s composition would differ substantially from that of Earth<sup>2</sup>, and thus would most naturally produce a Moon distinct from Earth in its chemical composition. Instead, Earth and the Moon are nearly chemically identical in many respects. Now, in a paper on page 212, Mastrobuono-Battisti and colleagues<sup>3</sup> estimate a substantial probability — of the order of 20%

— that the giant impactor had an Earth-like composition, offering at least a partial solution to the ‘isotopic crisis’<sup>4</sup> facing the impact theory.

A key constraint on any hypothesis is that the proportions of different isotopes of a given element vary slightly across samples from the Moon, Earth, Mars and the main asteroid belt that lies between the orbits of Mars and Jupiter. Perhaps the best-studied example involves oxygen (Fig. 1). Earth and the Moon have almost identical oxygen isotope compositions, whereas the difference in oxygen composition between terrestrial rocks and meteorites from Mars or the large asteroid Vesta is considerable<sup>5,6</sup>. Earth and the Moon also share similar isotopic compositions for chromium, silicon, titanium and tungsten, elements whose isotopic abundances vary across meteorites from Mars and the asteroid belt<sup>7</sup>.

How could the collision of two large and independently formed planets yield a chemically similar Earth and Moon, when Mars and



## 50 Years Ago

The award of the Order of Merit (the personal gift of the Queen) to Prof. Dorothy Hodgkin makes history in that she is the first woman scientist ever to receive it, and only the second woman to be so honoured by the monarch since the Order was instituted. That she should now be joining Florence Nightingale in this eminence has its parallels and its contrasts. Dorothy Hodgkin is a person of very deep humanitarian interests and concerns ... whose work, incidentally, has been carried out against the background of a demanding but happy family life. Her special genius has lain in the unravelling of the structure, by X-ray methods, of complex molecules, and its special timeliness has lain in the fact that she has carried it deep into the realm of biologically important substances (see *Nature* of December 5, 1964). Dorothy Hodgkin received the Nobel Prize in 1964.  
From *Nature* 10 April 1965

## 100 Years Ago

Until the last few years the word margarine was usually associated, in the mind of the British public, with poverty; but now, under the new name of “Nuts and milk,” with which advertising enterprise has made us familiar, it is becoming freely used in the kitchen, and is even found on the breakfast table in many households ... It is desirable at the outset to emphasise that the margarine industry is essentially scientific in character, and that considerable technical skill is demanded in its manufacture ... moreover ... edible fats available for the masses at half the price of butter ... must be proclaimed as yet another of the achievements of science in the service of man.  
From *Nature* 8 April 1915