

## ...meanwhile, elsewhere in Italy

SIR — Success in sports, high-school performance and scientific creativity seem to correlate with birth dates<sup>1-4</sup>. Recent observations by our group suggest that genetic and developmental parameters in newborn infants bear a relationship with season of birth.

The search for a possible adaptive

the population of Penne, a small rural town 438 metres above sea level in south-east Italy. The majority of the people admitted to the Town Hospital (including puerperae) live between 400 and 500 metres above sea level, but there are villages located at higher altitude. Cold winters characterize the climate of this area.

ACP<sub>1</sub>\*A GENE IN A SAMPLE OF NEWBORN FROM THE POPULATION OF PENNE

Month of birth	ACP <sub>1</sub> *A (%)	Gestation duration (weeks)	Birth weight (g)	Sex proportion (%)
Oct./Nov.	35.9±3.7	39.4±0.13	3,272±56	51.8±5.4
Dec./Jan.	35.5±3.5	39.5±0.15	3,345±51	51.6±5.2
Feb./Mar.	25.0±3.2	39.7±0.16	3,429±46	45.7±5.2
Apr./May	31.6±4.7	40.1±0.07	3,423±64	47.9±7.2
Jun./Sept.	19.7±4.9	39.6±0.21	3,383±61	45.6±8.7

value of ACP<sub>1</sub> (acid phosphatase controlled by locus 1) was the main purpose of our survey. The enzyme is a phosphotyrosine phosphatase and may have important functions in cellular growth regulation and in the modulation of glycolytic rate<sup>5</sup>. Population studies suggest a role in adaptation to environmental temperature<sup>6</sup> and we have recently shown associations with obesity and diabetes<sup>7,8</sup>.

We studied 352 newborn infants from

The table shows ACP<sub>1</sub>\*A frequency, gestational length, birth weight and sex of newborn infants from the population of Penne. ACP<sub>1</sub>\*A, the allele associated with the lowest ACP<sub>1</sub> activity, gestational length and birth weight show a significant association with season of birth ( $P < 0.01\%$ ). Most seasonal heterogeneity is due to differences between infants born in October–January and infants born in February–September, corresponding to conception in January–April

and May–December respectively. Infants born from October to January show a higher frequency of ACP<sub>1</sub>\*A, a reduced gestational duration and a lower birth weight compared with infants born from February to September. This pattern is in line with population and biochemical studies suggesting that low-activity genotypes may have an increased metabolic rate and a relative advantage in cold environments<sup>9</sup>.

Our observations suggest that season of conception and/or environmental temperature may influence intrauterine development. The effects on neonatal parameters measurable at a general population level seem rather small, but may be far-reaching in selected groups of talented people.

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