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'From the mouths of babes': A subadult dietary stable isotope perspective on Roman London (*Londinium*)

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ABSTRACT

Londinium (48–410 CE) was the focus for Roman administration and trade in Britain; it was established and inhabited by people from across the Empire who continued to practice their diverse food-ways. Roman London was a unique settlement, whose fluctuating economic and political fortunes throughout Roman occupation are clearly evidenced in the archaeological and historical records. This study conducts stable isotope analysis of the diet of a large sample of subadults (0–20 years old) dating from the 1st to 4th centuries AD in London. It includes an assessment of breastfeeding and weaning practices, but aims to focus more on the diets of older children and the transition to 'adult' dietary behaviours. The rib bones of 100 subadults and 20 adults were sampled for carbon and nitrogen isotopes. Using these data, we identified an infant feeding pattern that differed from contemporaneous sites in Italy and which remained unchanged over time, a special diet for nursing females, and temporal changes in diet, whereby subadults consumed greater quantities of freshwater resources compared to adults during periods of economic instability.

1. Introduction

1.1. Roman London (Londinium)

The settlement of *Londinium* is unique in Roman Britain, as it appears to have been established in c. 48 CE by merchants from the Continent with the support of the military, particularly with respect to the provision of infra-structure (Wallace, 2014). The settlement spanned the River Thames and was home to migrants from across the Empire, the military and merchants, but also acted as the Imperial administrative centre for the province and its economic hub, being the location where the coinage was minted (Perring, 1991; Marsden, 1986; Perring, 2015). *Londinium*'s fortunes fluctuated throughout the 400 years of Roman occupation (Table 1). The earliest phase (48–60 CE) has evidence for links to the Continent, through primary sources such as letters and the presence of imported food-stuffs (e.g., olives) and material culture (e.g., Samian ware). It was razed to the ground during the Boudican revolt of 60 CE, but afterwards was extensively rebuilt and by 100 CE was the administrative centre of the province (*Britannia*); however, large parts of it were again destroyed during the 2nd century AD by the 'Hadrianic fire'. By the third and fourth centuries AD, the political instability on the Continent affected *Londinium*'s fortunes once more and it experienced episodes of decline and regeneration, until Imperial rule was withdrawn in the early 5th century AD (Perring, 1991; Marsden, 1986).

Following the Roman urban tradition, cemeteries were located on the periphery of the settlement (Fig. 1), alongside the main roads leading from *Londinium* to other centres across Britain (Perring, 1991). These extra-mural burial locations were first recorded by antiquarians, but have been intensively investigated more recently through contractor archaeology in response to development and infra-structure projects, during which many hundreds of burials have been recovered (Hall, 1996; Barber and Bowsher, 2000). Overviews of the burial evidence show that both cremation and inhumation were practiced from the outset in *Londinium*, with inhumations typically placed within wooden coffins, although more expensive containers (stone sarcophagi or lead coffins) and high status or 'exotic' funerary contexts have been encountered (Barber and Bowsher, 2000; Ridgeway et al., 2013). One such is the 18–25-year-old adult female from Spitalfields who had travelled from Rome to *Londinium*. Her body had been embalmed, dressed in a silk and gold fabric with her head lying on a bed of bay leaves in a lead coffin, and within her stone sarcophagus were several

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Table 1
Summary of the archaeological phases of Roman London (Londinium) (Wallace, 2014; Hill and Rowsome, 2011; Marsden, 1986; Perring, 2011).

Phase and date (AD)	Summary of major changes and finds
1: 1st century	Wooden settlement founded in c. 48 CE, whose material culture shows strong connections to Gaul and the Mediterranean. Destroyed during the Boudican rebellion (60 CE).
2: 1st and 2nd centuries	Height of the settlement's success. By 100 CE it replaced Colchester as the main centre for the province but was devasted by the 'Hadrianic fire' in 122 CE. Rebuilt with substantial public architecture (e.g. forum and port) and made capital of Britannia Superior in 193 CE.
3: 2nd and 3rd centuries	Continuation of public building works but the settlement went into decline and some areas were abandoned. This is likely to be a result of the social and political upheaval caused by the province separating to form part of the Gallic Empire and then rejoining the Roman Empire.
4: 4th century	Many of the public buildings are demolished as punishment for joining the Gallic Empire. Londinium remained financial and administrative centre of Britannia, and the material culture record shows its continuing wealth.
5: 4th to early 5th centuries	The southeast area of the walled-settlement on the north bank contained houses with evidence for luxury imports but the northern part had been cleared and was wasteland or fields. Roman rule ended in 410 CE with the withdrawal of army.

glass vessels and a jet rod (Swain and Roberts, 1999; Brettell et al., 2015; Montgomery et al., 2010).

1.2. Environmental archaeological evidence for diet in Londinium

The environmental record from the settlement provides rich and varied evidence for the range of food-stuffs imported and consumed in *Londinium*, but as summarised in Table 1, the changing fortunes of the settlement affected availability (Cowan et al., 2009). The city is marked-out from other areas of Britain because of its diverse record and the presence of exotic plant species (e.g., black cumin and cucumber). As with other areas of the Empire, the majority of the diet is thought to have been cereals and pulses (Garnsey, 1999). The most frequently recovered cereal species are spelt wheat and barley, although the latter was considered to be more suitable for animals (Cowan and Wardle, 2009; Davis, 2011a, 2011b; Cool, 2006). The only evidence for millet consumption is a single grain from a 2nd century AD deposit (Willcox, 1977); but it has also been identified isotopically in one adult from Spitalfields (Shaw et al., 2016). Oats and rye have been recovered but in very low quantities, suggesting that spelt wheat was the main cereal resource. The Boudican and later Hadrianic fire destruction deposits have preserved large quantities of lentils, which would have been imported from the Mediterranean (Davis, 2011a, 2011b; Tyers, 1988; Callender, 1965). Post-conquest, the evidence for horticulture increases in Roman Britain (van der Veen, 2014) and this is attested in *Londinium*, with evidence for peas and beans as well as fruit and vegetables, including native species of nuts and wild cherry, blackberry/raspberry, along with imports including, dates, damsons, walnuts and almonds (Cowan and Wardle, 2009; Davis, 2011a, 2011b; Willcox, 1977; van der Veen et al., 2008; Wardle and Rayner, 2011). Pollen evidence has identified carrots, beets and the brassica/sinapis family (e.g., cabbage) as well as non-native and native herbs and spices (e.g., anise and poppy seeds) (Davis, 2011a, 2011b; van der Veen et al., 2008).

The abundant evidence for butchery in *Londinium* suggests that, for many, their diet included a proportion of meat. The most frequently consumed animals were cattle and pig, which King (1999a, 1999b, 2001) has found to be common on urban and military sites in Britain. Some deposits in the settlement contained the remains of neonate and young calves, suggesting that milk was produced, supported by the discovery of a cheese-press and other strainers in *Londinium* (Cool, 2006; Bluer et al., 2006). Other domesticates included sheep/goats, poultry and domestic fowl, with chickens being the most commonly identified species, and fragments of their eggshells have also been recovered (Cowan and Wardle, 2009; Drummond-Murray and Thompson, 2002; Sidell, 2011; Hill and Rowsome, 2011). Again, as with the presence of exotic imports, the consumption of poultry is proposed to have been confined to high status individuals (Cool, 2006), therefore the relative abundance of these in *Londinium* reflects its status as place of administrative and financial power. In contrast to other settlements in Britain, particularly military ones (King, 1999b), there is a limited range of wild game, such as deer, hares and woodcocks (Cowan and Wardle, 2009; Bluer et al., 2006; Hill and Rowsome, 2011). Once again, this is interpreted as being reflective of high status consumption (Cool, 2006).

The evidence for fish consumption in *Londinium* reflects its river location and through this, access to the coast, but also the presence of people with Mediterranean-style food-ways. Analysis has found that the most commonly encountered species were freshwater and estuarine types, mainly eel and flounder/flatfish (Locker, 2007), but species such as cod, mackerel, herring, pike, chub and trout have also been recovered (Locker, 2007). Expensive and rare fish, such as sturgeon and turbot have been identified, suggesting that elite dining took place within the settlement (Locker, 2007). Overall, it seems that local resources were more likely to be exploited rather than relying on imported fish, although fish sauce (garum) was an important commodity, transported from Spain and north Africa in amphora (Cool, 2006). Many complete and fragmentary amphora have been discovered – one imported from Antibes (southern France) and still containing mackerel heads was stamped: "Lucius Tettius Africanus' excellent fish sauce from Antipolis" (Tomlin et al., 2009, RIB ii.6, 2 2492.24).

1.3. The children of Londinium

The archaeology of *Londinium* has revealed primary source evidence for children, such as the famous writing tablet detailing the sale of Fortunata, a Gaulish slave girl (Tomlin, 1993), as well as a limited number of funerary inscriptions, such as that of 15-year-old Marcus Aurelius Eucarpus (Tomlin et al., 2009, RIB 10), and a fragment of a sculpture depicting a small child holding a ball. Numerous children's leather shoes have also been recovered, which is unsurprising as leatherworking was an important industry in the settlement, and two small leather bikini briefs, possibly worn by children (Wilmott, 1982; Keily, 2011). The most fruitful source of evidence for examining the experiences and perceptions of children in *Londinium*, however, are the funerary remains.

Unfortunately, no comprehensive study of the funerary evidence has been undertaken to explore the relationship between social and biological age, such as Gowland's (2001) research on Lankhills cemetery (Hampshire), which linked burial practice and grave inclusions to life course stages. Such a study from *Londinium* would be immensely difficult, because of the paucity of grave-goods for all age-groups throughout the four centuries of use (Hall, 1996; Barber and Bowsher, 2000). Study of the cemetery reports reveals that the inhumed subadults were buried with animal inclusions (e.g., chicken), a coin, pottery and/or glass ware, accompanied by piped clay figurines, and often in coffins (wood and lead) (Barber and Bowsher, 2000; MacKinder, 2000; Watson, 2003). The skeletal remains are therefore the key source of evidence for understanding childhood in *Londinium*.

1.4. Childhood diet in Roman Britain

There is no primary source evidence for childhood food-ways and

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