Supplementary Information for

Intra-gastric phytoliths provide evidence for folivory in basal avialans of the Early Cretaceous Jehol Biota

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This PDF file includes:

Supplementary Note 1： Systematic Paleontology

Jeholornis Zhou & Zhang, 2002

Type species *Jeholornis prima* Zhou & Zhang, 2002

The new specimen (IVPP V14978) was acquired in Gong-Gao Village in Chaoyang County in western Liaoning Province, northeastern China during the 2006 field season led by IVPP crews, and it was deposited in the collection of the Institute of Vertebrate Paleontology and Paleoanthropology in Beijing. It can be referred to *Jeholornis prima* by the combination of both skeletal and integumental morphologies[1,2].

As in the holotype of *J. prima* and other referred specimens of *Jeholornis*, the overall shape of the diapsid skull in the new specimen is triangular in lateral view (Fig. 1). Its rostrum is largely edentulous with only one or two tiny dentary teeth and a maxillary tooth recognizable (Supplementary Fig. 1 and Supplementary Dataset 1). The premaxillae bear a dome-like arch with the indented junction close to rostral end of the nasal (Supplementary Fig. 1). The wide rod-like maxillae occupy a large portion of the skull, which is about one-third of the entire skull length. The lower jaw is robust as in other individuals of Jeholornithidae[3]. The rostro-dorsal trend of the dentary is slightly convex in the middle as previously seen in the holotype and other referred specimens of *J. prima*, in addition to other closely related taxa[4,5]. The tetraradiate palatine bone is exposed under the maxillae (Supplementary Fig. 1). Differing from *Archaeopteryx* and other non-avialan theropods, the caudal extension of the palatine of the new specimen is shorter. Caudally, a nearly square-shaped squamosal is recognized, with its dorsal and ventral margins slightly concave. The thick rod-like jugal bar bears a large dorsal process caudally. An inverted ‘L’-shaped quadratojugal is present, caudal to the quadratojugal (Supplementary Figs. 1 and 2). The outline of the quadrate forms a right triangular shape in lateral view with the hypotenuse as the rostral margin (Supplementary Fig. 1). Under the postdentary, the hyoid apparatus is composed of a separate bony ceratobranchial and dorsally deflected epibranchial elements (Fig. 1 and Supplementary Fig. 2).

The robust furcula is boomerang-like, and preserved underneath other cervical bones, being visible only in the CL slices (Supplementary Dataset 1). The strut-like coracoid bears a limited procoracoid process and an oval-shaped supracoracoideus nerve foramen under the blunt acrocoracoid process (Supplementary Fig. 2). The procoracoid process extends medially into a flange and distally, a process is present along its lateral margin in distal end. The lateral margin of coracoid is slightly convex (Supplementary Fig. 1).

The unfinished appearance of humerus (proximal periosteal part) suggests the bird individual died in at a subadult stage of development. The primary and secondary pennaceous feathers are well developed and long, which articulate with the forearm forming a very pointed wing shape (Fig. 1). The manual digits of *Jeholornis* are quite distinct, and the phalanges of digits II and III are identified with articulated distal unguals in the new specimen. The manual ungual of the major digit (digit II) is larger than that of digit III (Supplementary Fig. 1). The unreduced manual phalanx of digit III (III-3) is long and slender as in the holotype of *Jeholornis prima*. The robust manual phalanx II-2 is longer than the phalanx III-3 (Supplementary Fig. 1). This difference is a feature that can be used to distinguish *Jeholornis* from other more basal avialan and other more derived ornithuromorphs[2,4].

The femur of the new specimen is only slightly longer than that of another referred specimen of *Jeholornis prima* (IVPP V 13350)[2]. The distal tibiotarsus has an astragalar ascending process. The metatarsal II is the shortest of the three metatarsals with metatarsal IV slightly longer, and metatarsal III the longest (Supplementary Fig. 1). The relative extension of three metatarsals distally distinguishes the new specimen from that of *J. palmapenis*, in which the metatarsi trochlea II and IV are rather close to each other in their distal extension[4]. The second metatarsal is slightly deflected medially. Other features the distinguish the two species from one another include the presence of a proximal fan-shaped feather cluster above the pelvis in *J. palmapenis,* that is absent in *J. prima* (and the new specimen).

The synsarcral vertebrae include five to six fused vertebrae with long transverse processes identified in the caudal two fused vertebrae (Supplementary Fig. 2). The dorsal surface of the ilium appears to be flat, differing from the convex dorsal margin in *J. palmapenis.* The caudal part of the ilium tapers and bends ventrally. The ischium has a dorsal process that projected high with a relatively lower intermediate process present in other *Jeholornis*[2] specimens**.** The intermediate process of the ischium is located near the middle part of the ischial shaft. The distal pubis bears an expanded ball-like process.

At least 23 caudal vertebrae are recognizable and comprise the long bony tail, consistent with the published range for Jeholornithidae[3]. The cranial portion of the caudal vertebrae are shorter than the middle ones, forming a wide and square shape. The caudal vertebrae increase in length with the longest ones being the 5^{th} -10^{th} caudals Caudally, they then become gradually tapered and narrower dorsoventrally (about 10^{th} - 22^{nd}). The bony chevron series changes its shape as well along with the transition to the different caudal regions. The chevron bones are well developed in the cranial ones of the caudal vertebrate (up to 4^{th} -5^{th}), and they have rectangular shape., Then, they become slim and rod-like shape in the middle and caudal region of the caudal vertebrae. The pre- and post-zygapophyses within the long-shaped middle caudal series is fork-like, and they are tightly interlinked together.

The distal caudal vertebrae of the new specimen are articulated with the small frond-like rectrices in the last five caudal vertebrae (Supplementary Fig. 1). In total, at least six pennaceous feathers are recognizable on each side (Supplementary Fig. 1). The morphology of the tail feathering is like that of the referred specimen of *Jeholornis* (IVPP V13350), which is also associated with the distal six caudal vertebrae, forming a small rectrical fan. As previously argued, the small rectrices plane formed by these tail feathers had limited aerodynamic function, and they might only have served a sexual or ornament signaling role[6,7].

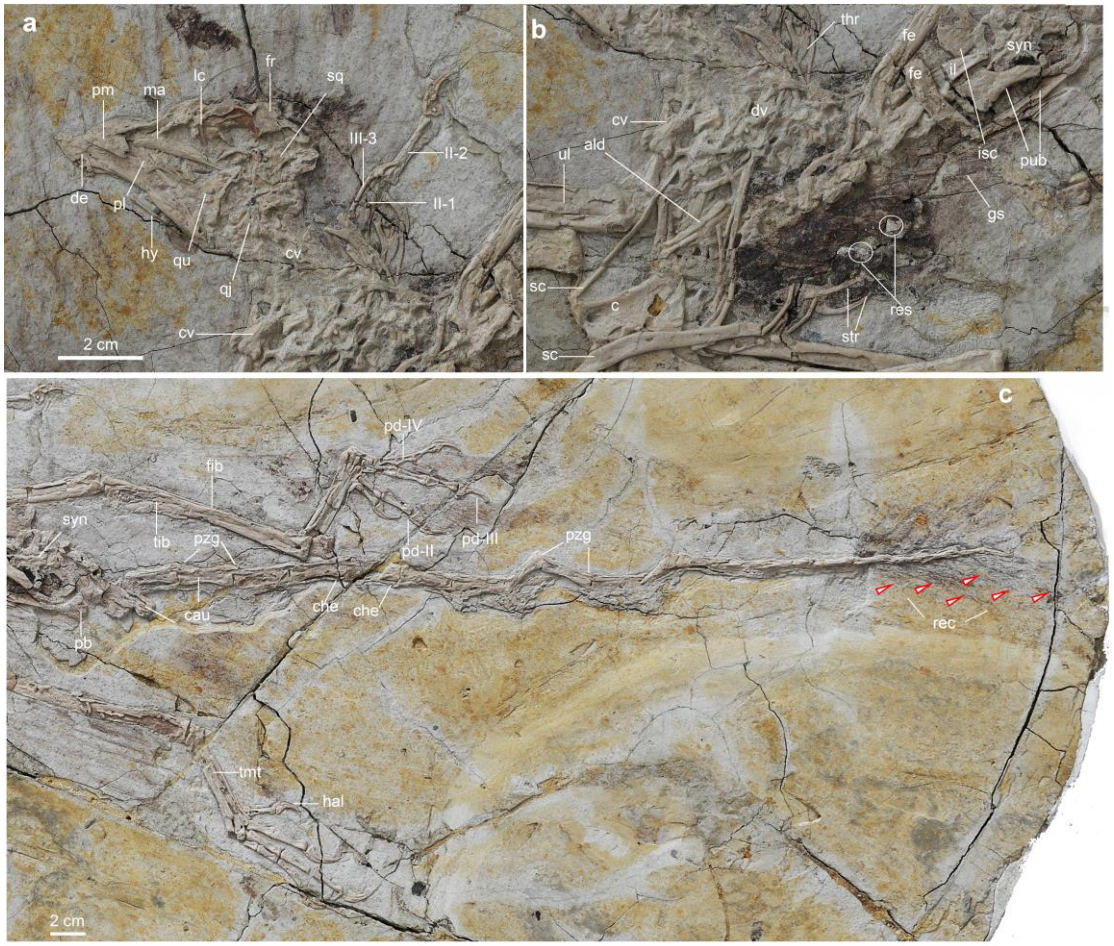
This dentary (rostro-dorsal trending) morphology is comparable to the that of the extant hoatzin (*Opisthocomus hoazin*), whose main diet are swamp tree leaves in tropical forests[8]. The feature was identified as indirect and supportive evidence of definite plant-based feeding in birds[9]. As shown in the revaluation of GMM data, many selected taxa of herbivorous Galliformes and Anseriformes, share a similar mandibular shape with the hoatzin and the *Jeholornis*. Two raptorial birds (*Vultur* and *Micrastur*) also plot quite close to *Jeholornis*, and this position could be the result of convergence in jaw function for tearing food items shared by these taxa. For the hoatzin, the unreduced manual unguals in the juvenile hoatzin resemble those of *Jeholornis*, in terms of functioning in arboreal climbing[10].

The size of the specimen also is consistent with this ontogenetic assessment, which is smaller than the holotype, but close to a smallest referred specimen (IVPP V13350). A histological section taken from the rib segment documents only one line of arrested growth line. The osteo-histological and other rough surface features on bone support our assessment of its subadult stage.

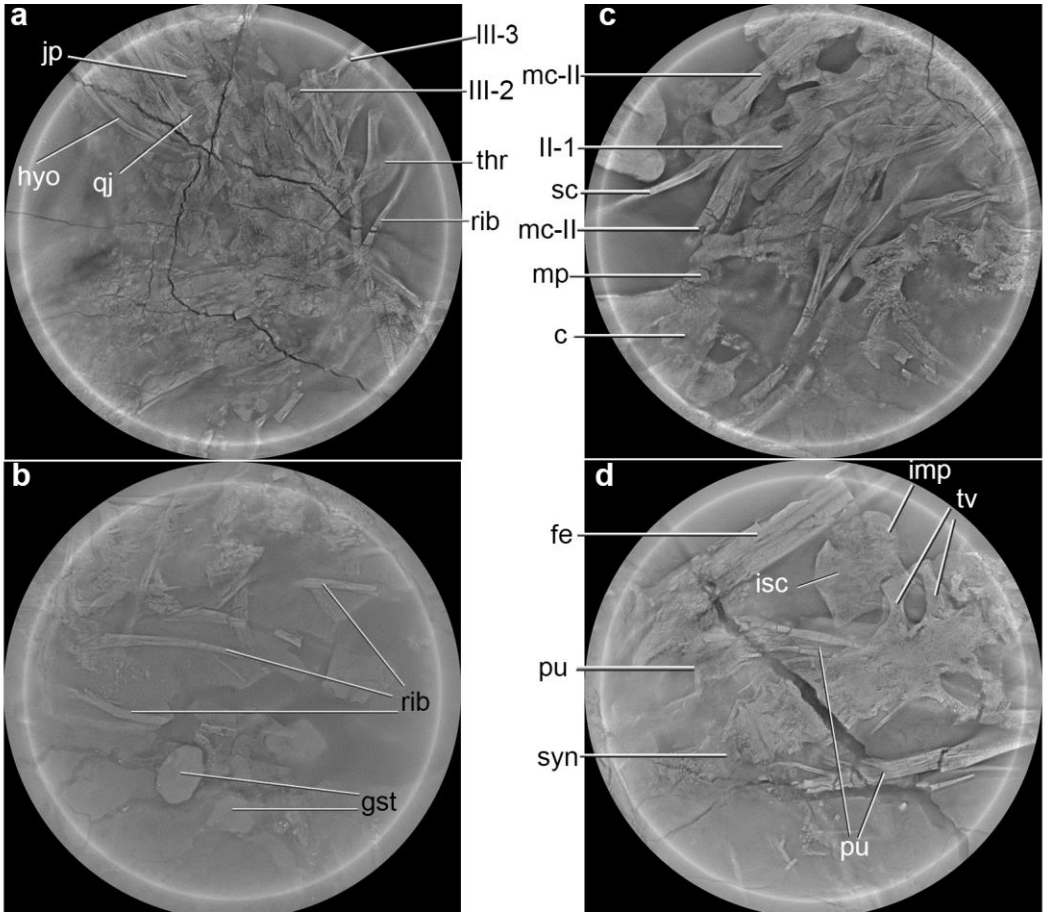
Supplementary Note 2: Identification of the Stomach content

The stomach content is identified as carbonized materials mostly concentrated within the thoracic rib cage. The identifiable stomach content is determined by their position, black color, and woods-like text which likely formed with the carbonatization of organic materials during diagenesis. The residue is specifically located within the thorax cavity trapped within in the abdominal part of the body within the rib cage. A few gastroliths identified with a smooth surface and oval shape are clumped within the gut content residues (Supplementary Dataset 1). The packing and arrangement of this residue support it belonging to the stomach and was separated away from the bottom-matrix (Supplementary Fig. 1).

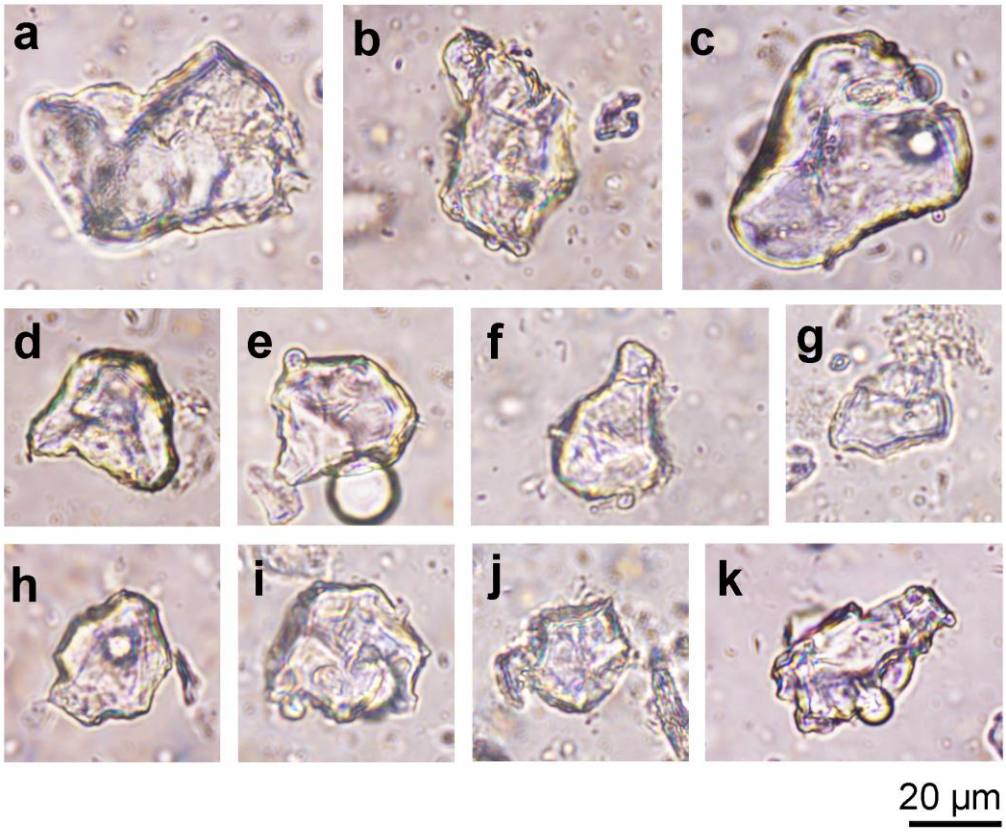
Supplementary Figures



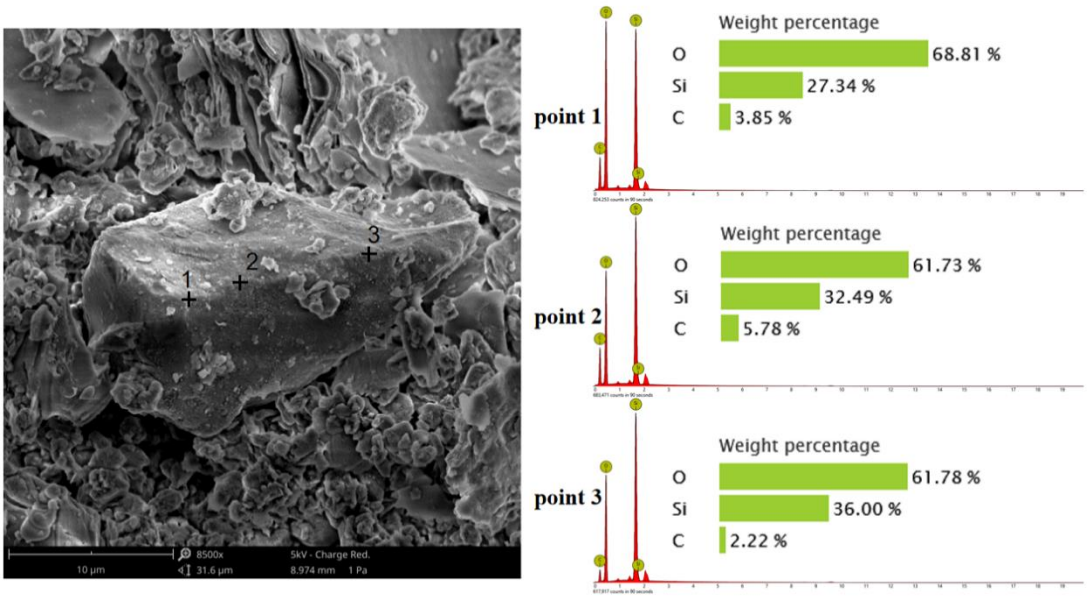
Supplementary Figure 1. The enlarged photos with detailed anatomical features revealed in the new referred *Jeholornis* specimen (IVPP V14978). (a) cranial part, (b) thoracic part, (c) caudal part. Anatomical abbreviations: ald, alular digit; c, coracoid; cau, caudal vertebrate; che, chevron; cv, cervical vertebrate; de, dentary; dv, dorsal vertebrate; fe, femur; fib, fibula; hal, hallucal claw; fr, frontal; hy, hyoid; II-1, phalanx II-1; II-2, phalanx II-2; III-3, phalanx III-3; il, ilium; isc, ischium; lc, lacrimal; ma, maxilla; pb, pubic boot; pd-II, III, and IV, pedal digits II, III, and IV; pl palatine; pm, premaxilla; pzg, pre- and post- zygopophysis of the caudal vertebrae; qj, quadratojugal; qu, quadrate; rec, rectrix; res, residue of the stomach content extracted; sc, scapula; sq, squamosal; syn, synsacrum; thr, thoracic rib; tib, tibiotarsus; and tmt, tarsometatarsus.



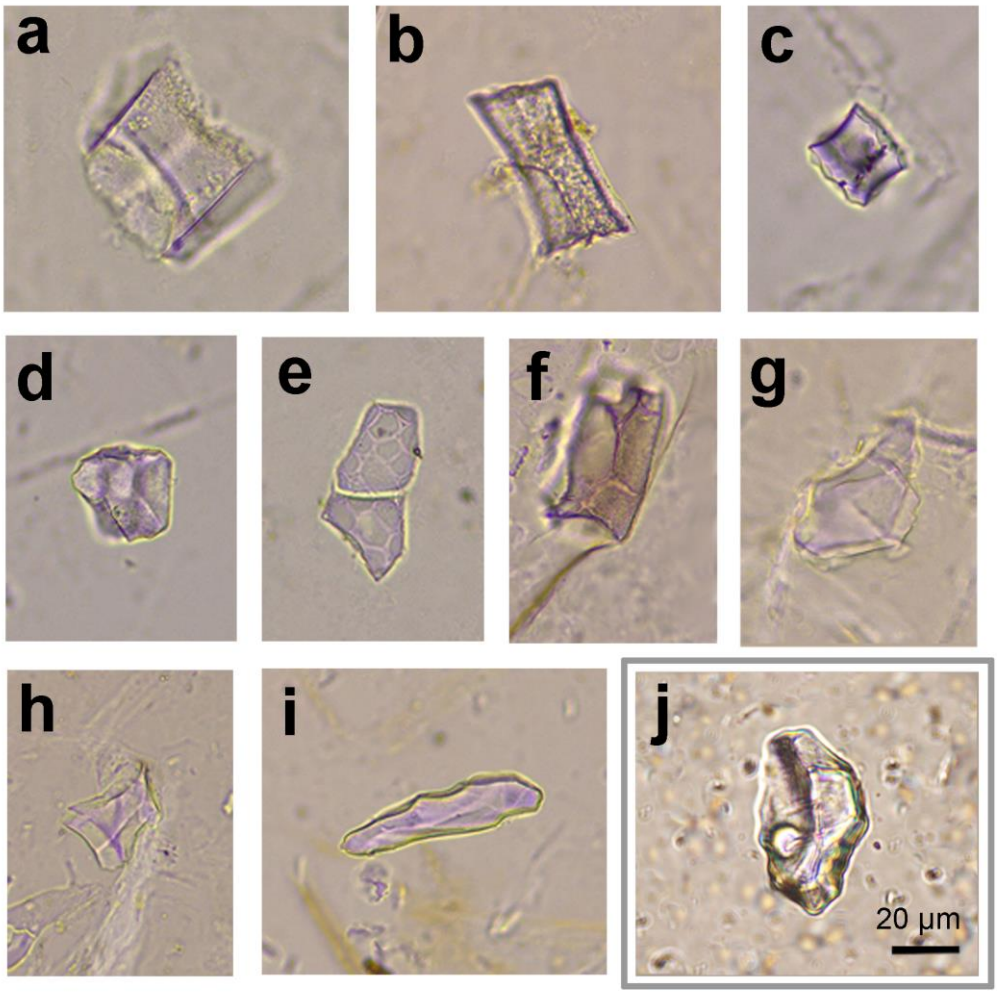
Supplementary Figure 2. CL scan slices with a focus of different regions imaged for the new specimen, (a) caudal skull, (b) thoracic region, (c) cervical and pectoral region, (d) pelvic region. Anatomical abbreviations: c, coracoid; fe, femur; gst, gastroliths; hyo, hyoid; II-1, phalanx II-1; II-2, phalanx II-2; III-3, phalanx III-3; imp, intermedial process of ischium; jp, jugal process; isc, ischium; mc-II, major metacarpal; mp, medial process of coracoid; pu, pubis; qj, quadratojugal; sc, scapula; syn, synsacrum; and tv, transverse process.



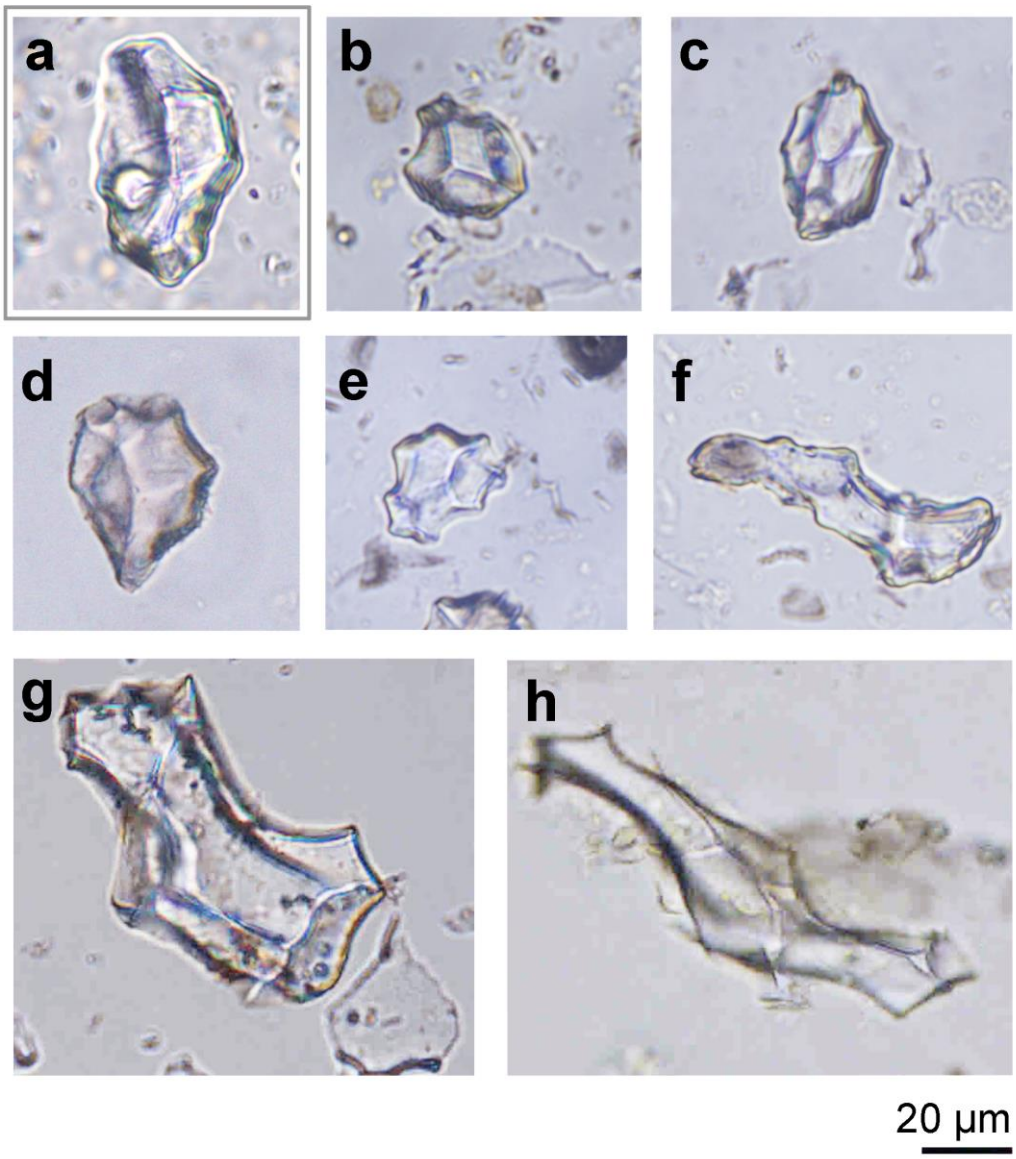
Supplementary Figure 3. Phytoliths extracted from stomach content of the referred specimen of *Jeholornis* (IVPP V14978). (a) to (j) was identified as the blocky phytoliths; (k) is an unidentifiable phytolith. Independent experiments were performed twice with similar results; scale bar applies to all panels.



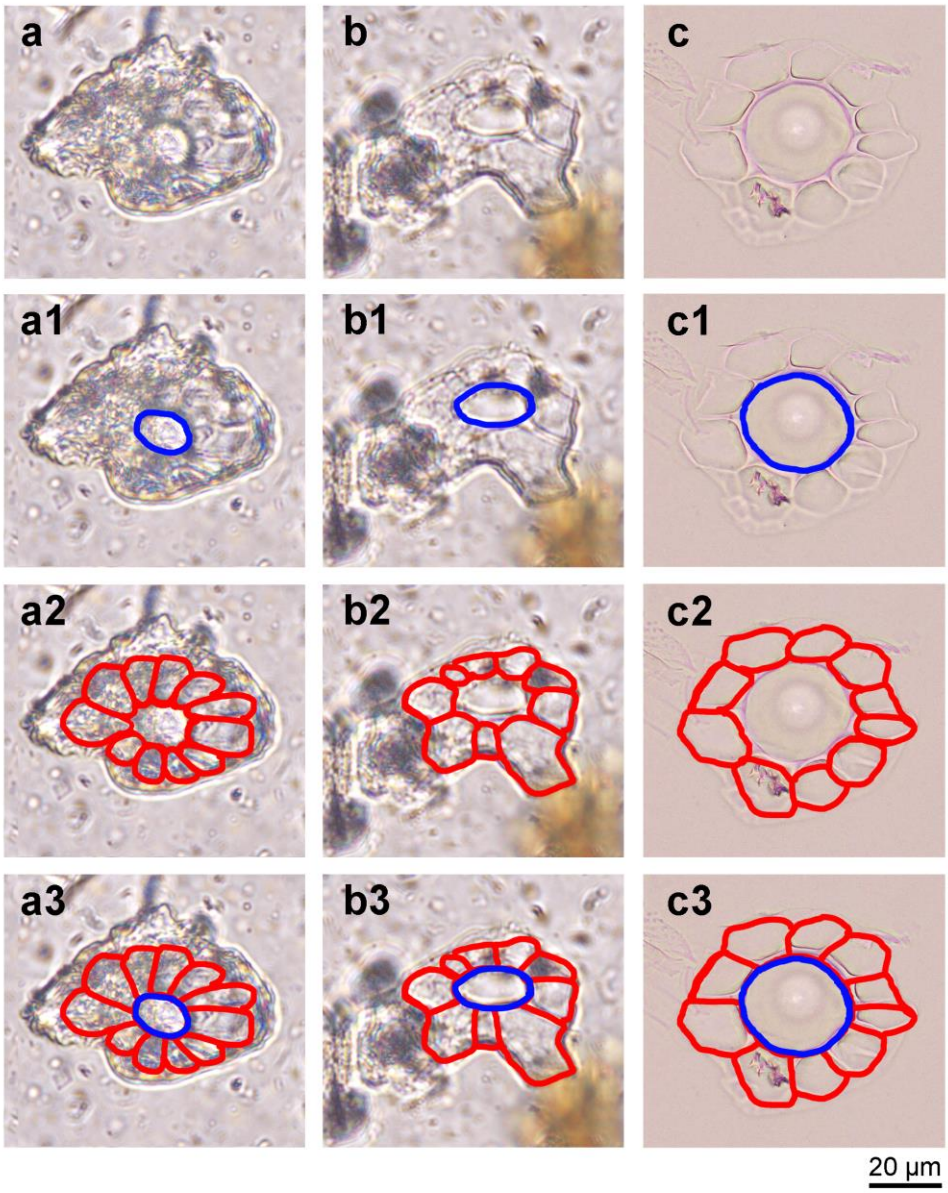
Supplementary Figure 4. SEM-EDX analysis of a phytolith recovered from the stomach content of the new *Jeholornis* specimen.



Supplementary Figure 5. Comparison between blocky phytoliths with the ridgeline ornament as proposed the modern candidates (a-i) to which the fossil (j) likely relates. (a) *Equisetum ramosissimum* from Yunnan, China; (b) *Pinus armandii* from Tibet, China; (c)-(d) *Oryza sativa* from Zhejiang, China; (e) *Quercus* sp. from Sichuan, China; (f) *Magnolia* sp. from Luzon, Philippines; (g), (i) *Machilus nanmu* from Sichuan, China; (j) fossil blocky phytoliths with wavy ridgelines from the stomach content of *Jeholornis* (IVPP V14978), possibly related to the blocky phytoliths in modern Magnoliales leaves (f) to (i). Independent experiments were performed twice with similar results; scale bar applies to all panels.



Supplementary Figure 6. Comparison between the blocky fossil phytoliths extracted from the digestive tract content of *Jeholornis* (IVPP V14978) **(a)** and blocky phytoliths with the ridgeline ornament extracted from modern Magnoliaceae **(b-h)**. (a), fossil blocky phytoliths with wavy ridgelines from the stomach content of *Jeholornis* (IVPP V14978), possibly related to blocky phytoliths in modern Magnoliales leaves. (b), *Lirianthe henryi* (Dunn) N.H. Xia & C.Y. Wu; (c), *Magnolia coco* (Lour.) DC. (d), *Manglietia decidua* Q.Y. Zheng; (e), *Manglietia fordiana* Oliv.; (f), *Yulania denudata* (Desr.) D.L. Fu; (g), *Magnolia championii* Benth. (h), *Yulania amoena* (W.C. Cheng) D.L. Fu. Independent experiments were performed twice with similar results; scale bar applies to all panels.



Supplementary Figure 7. Comparison between one additional type of fossil phytolith **(a, b)** extracted from the digestive tract content of *Jeholornis* (IVPP V14978), which has a round shape with a protuberant center, with similar modern hair base phytoliths extracted from extant *Ficus tikoua* leaves **(c).** a1-a3, b1-b3, and c1-c3 are respective images of a, b, c with highlighted key features in blue and red. Blue outlines indicate the center papillae of the hair base. Red highlights the surrounding cells whose cell walls formed the surrounding radiate lines. These two key characteristics identified in the fossil hair base are consistent with the modern hair base. Scale bar applies to all panels.

Supplementary Table 1. Measurements of major elements in referred specimen of *Jeholornis* IVPP V14978 (in mm).

Elements	Right side	Left side		Ratio
Humerus length	87.1	90.0	Humerus/ femur length	1.62
Ulna length	87.9		Ulna/Humeral length	0.99
Femur length	55.2	54.3	Tibiotarsus/ femur length	1.26
Tibiotarsus length	67.2	70.5		
Tarsometatarsi III length	33.0	37.0		
Skull length	53.3			
Coracoid height	27.2			

Supplementary Table 2. Sampled bird lists with dietary survey used in the GMM plots.

R_name	Diet	Genus
*Acanthisitta_chloris*_YPM_125219	Other	*Acanthisitta*
*Accipiter_nisus*_NHMUK_S1982.149.1	Other	*Accipiter*
*Alcedo_atthis*_NHMUK_S_1994.7.1	Other	*Alcedo*
*Anas_discors*_NHMUK_S2001.41.5	Other	*Anas*
*Anhinga_anhinga*_FMNH_491374	Other	*Anhinga*
*Anser_fabalis*_NHMUK_1895.2.6.9_	Plant eaters (Anseriformes)	*Anser*
Anseranas semipalmata NHMUK 1852.7.22.1	Plant eaters (Anseriformes)	*Anseranas*
Apaloderma_narino_FMNH_290897_	Other	*Apaloderma*
Apteryx_australis_FMNH_391011	Other	*Apteryx*
Aramus_guarauna_FMNH_376078	Other	*Aramus*
Archilochus_colubris_FMNH_484738	Other	*Archilochus*
Ardea_alba_UMZC_338H	Other	*Ardea*
Arenaria_interpres_FMNH_313992	Other	*Arenaria*
Aythya_ferina_NMHUK_1851.12.23.15	Plant eaters (Anseriformes)	*Aythya*
Balaeniceps_rex_NHMUK_S1952.1.100	Other	*Balaeniceps*
Balearica_pavonina_NHMUK_1859.10.26.5_ROGER	Other	*Balearica*
Barnardius_zonarius_NHMUK_S_1983.5.1	Other	*Barnardius*
Bonasa_umbellus_FMNH_348972	Plant eaters (Galliformes)	*Bonasa*
Bucco_capensis_FMNH_330305	Other	*Bucco*

Bucorvus_abyssinicus_NHMUK_S2006.31.20_	Other	*Bucorvus*
Burhinus_senegalensis_FMNH_313704	Other	*Burhinus*
Buteo_rufofuscus_NHMUK_1862.1.18.1	Other	*Buteo*
Calandrella_cinerea_NHMUK_S1961.13.34	Other	*Calandrella*
Calyptomena_viridis_NHMUK_s1969.1.70	Fruit	*Calyptomena*
Capito_niger_FMNH_321049	Fruit	*Capito*
Caprimulgus_macrurus_FMNH_392245	Other	*Caprimulgus*
Caracara_cheriway_UMMZ_133664	Other	*Caracara*
Cariama_cristata_FMNH_105653	Other	*Cariama*
Cathartes_burrovianus_UMMZ_227466	Other	*Cathartes*
Chaetura_brachyrua_UMMZ_157689	Other	*Chaetura*
Charadris_vociferus_FMNH_470173	Other	*Charadris*
Chauna_chavaria_OUMNH_23790	Plant eaters (Anseriformes)	*Chauna*
Chelidoptera_tenebrosa_YPM_114404	Other	*Chelidoptera*
Chloropipio_holochlora_FMNH_288169	Other	*Chloropipio*
Cholroceryle_amazona_UMMZ_209261	Other	*Cholroceryle*
Chordeiles_minor_UMMZ_233923	Other	*Chordeiles*
Choriotis_kori_UMMZ_210444	Other	*Choriotis*
Chunga_burmeisteri_FMNH_106731	Other	*Chunga*
Climacteris_melanura_UMMZ_214303	Other	*Climacteris*
Colinus_virginianus_FMNH_105065	Plant eaters (Galliformes)	*Colinus*
Colius_macrourus_FMNH_368959_	Fruit	*Urocolius*
Colius_striatus_FMNH_384817	Fruit	*Colius*
Columba_palumbus_UMZC_409A_	Other	*Columba*
Columbina_minuta_FMNH_289160	Other	*Columbina*
Coracias_benghalensis_NHMUK_S1987.19.15	Other	*Coracias*
Corvus_brachyrhynchos_FMNH_441515_	Other	*Corvus*
Corythaeota_cristata_FMNH_313066	Fruit	*Corythaeola*
Crax_mitu_FMNH_320386	Fruit	*Crax*
Crypturellus_tataupa_UMMZ_201948	Other	*Crypturellus*
Cuculus_fugax_FMNH_357420	Other	*Cuculus*
Dendrocygna_bicolor_UMMZ_219885_	Plant eaters (Anseriformes)	*Dendrocygna*
Deroptyus_accipitrinus_NHMUK_S2002.14.2	Other	*Deroptyus*
Diomedea_irrorata_NHMUK_S1963.28.4	Other	*Diomedea*
Elaenia_flavogaster_FMNH_394495	Other	*Elaenia*
Elanus_caerulenus_NHMUK_1850.8.15.159	Other	*Elanus*
Eudromia_elegans_UMMZ_156966	Other	*Eudromia*
Eurypyga_helias_FMNH_317341	Other	*Eurypyga*
Falco_sparverius_UMMZ_154452	Other	*Falco*
Falco_sparverius_UMMZ_154462	Other	*Falco*

Fregata_aquila_NHMUK_1890.11.3.3	Other	*Fregata*
Fringilla_coelebs_OUMNH_24647	Other	*Fringilla*
Galbula_dea_FMNH_376705_ALL_	Other	*Galbula*
Gavia_stellata_NHMUK 1891.7.20.132	Other	*Gavia*
Glareola_pratincola_FMNH_368875	Other	*Glareola*
Grus_leucogeranus_UMZC_344D	Other	*Grus*
Haematopus_ostralegus_FMNH_363899	Other	*Haematopus*
Hemiprocne_comata_UMMZ_158224	Other	*Hemiprocne*
Hirundinea_bellicosa_UMMZ_200850	Other	*Hirundinea*
Hymenops_persipicillata_UMMZ_158790	Other	*Hymenops*
Indicator_exilis_FMNH_429726	Other	*Indicator*
Ixobrychus_minutus_NHMUK_S_2007_61.1_	Other	*Ixobrychus*
Jacana_jacana_NHMUK_S_1990.2.5	Other	*Jacana*
Jynx_torquilla_NHMUK_s1986.36.10	Other	*Jynx*
Larus_novae-hollandiae_UMZC_274.C_	Other	*Larus*
Leptoptilos_crumeniferus_NHMUK_S_1952.3.182	Other	*Leptoptilos*
Leptotila_rufazilla_FMNH_318659	Other	*Leptotila*
Limosa_lapponica_NHMUK_S_1994.46	Other	*Limosa*
Malurus_melanocephalus_UMMZ_224775	Other	*Malurus*
Megalaima_chrysopogon_NHMUK_1850.8.15.28	Fruit	*Megalaima*
Melanopareia_torquata_FMNH_335140	Other	*Melanopareia*
Menura_novaehollandiae_FMNH_336751	Other	*Menura*
Micrastur_ruficollis_FMNH_330226	Other	*Micrastur*
Momotus_momota_NHMUK_S_2105.23	Other	*Momotus*
Monias_benschi_NHMUK_1924.11.29.1	Other	*Monias*
Myiobius_varbatus_FMNH_386812	Other	*Myiobius*
Myrmornis_torquata_YPM_106157	Other	*Myrmornis*
Myrmothera_campanisona_FMNH_322348	Other	*Myrmothera*
Neodrepanis_coruscans_FMNH_363807	Other	*Neodrepanis*
Numida_meleagris_FMNH_390428	Plant eaters (Galliformes)	*Numida*
Nyctibius_griseus_UMMZ_136371	Other	*Nyctibius*
Oceanodroma_leucorhoa_NHMUK_S1953.3.10	Other	*Oceanodroma*
Odontophorous_guttatus_UMMZ_210631	Plant eaters (Galliformes)	*Odontophorous*
Opisthocomus_hoazin_NHMUK_S1961.6.1	Leaf eaters (hoazin)	*Opisthocomus*
Ortalis_ruficauda_UMMZ_155489	Fruit	*Ortalis*
Pandion_haliaetus_FMNH_437336	Other	*Pandion*
Pedionomus_torquatus_NHMUK_A1970.12.1	Other	*Pedionomus*
Pelagodroma_marina_NHMUK_1895.7.1.163_ALL	Other	*Pelagodroma*
Pelecanoides_urinatrix_NHMUK_S2006.1.14	Other	*Pelecanoides*
Pelecanus_occidentalis_NHMUK_S1973.66.16	Other	*Pelecanus*

Phaethon_lepturus_NHMUK_1876.3.16.3	Other	*Phaethon*
Phalacrocorax_albiventer_NHMUK_S_2012.36.1	Other	*Phalacrocorax*
Phoenicopterus_roseus_UMZC_346B_ALL	Other	*Phoenicopterus*
Phoeniculus_purpureus_FMNH_368956	Other	*Phoeniculus*
Picus_viridis_NHMUK_NHMUK_S1982.5.1	Other	*Picus*
Pipra_erythrocephala_UMMZ_157210	Fruit	*Pipra*
Piprites_chloris_FMNH_290398	Other	*Piprites*
Podica_senegalensis_UMZC_209A_	Other	*Podica*
Poecile_atricapillis_FMNH_504323	Other	*Poecile*
Porphyrio_poliocephalus_NHMUK_S1952.1.93	Other	*Porphyrio*
Probosciger_aterriumus_NHMUK_S2006.15.5	Other	*Probosciger*
Psittacus_erithacus_NHMUK_S1992.41.60_	Other	*Psittacus*
Psittrichas_fulgidus_YPM_141821	Fruit	*Psittrichas*
Psophia_crepitans_FMNH_105783	Fruit	*Psophia*
Pterocles_quadricinctus FMNH 319937	Other	*Pterocles*
Ptilinopus_lechlancheri_FMNH_358261	Fruit	*Ptilinopus*
Ptilonorhynchus_violaceus_UMMZ_155483	Other	*Ptilonorhynchus*
Puffinus_tenuirostris_NHMUK_1850.8.15.152	Other	*Puffinus*
Pycnonotus_caffer_NHMUK_S1986.75.18_01	Other	*Pycnonotus*
Rallus_limnicola_FMNH_501812	Other	*Rallus*
Recurvirostra_avosetta_NHMUk_S1962.10	Other	*Recurvirostra*
Regulus_ignicapillus_NHMUK_S1952.2.662_	Other	*Regulus*
Rhamphastos_ambiguus_NHMUK_S2002.21	Fruit	*Rhamphastos*
Rhynchocyclus_olivaceus_FMNH_330600	Other	*Rhynchocyclus*
Rollandia_rollandia_UMMZ_156975	Other	*Rollandia*
Rollulus_rouloul_NHMUK_1871.7.20.87	Other	*Rollulus*
Rostratula_benghalensis_FMNH_319933	Other	*Rostratula*
Rupicola_peruviana_UMMZ_119210	Fruit	*Rupicola*
Rynchops_niger_FMNH_376309	Other	*Rynchops*
Sagittarius_serpentarius_NHMUK_1898.5.7.1	Other	*Sagittarius*
Sclerurus_mexicanus_FMNH_321715	Other	*Sclerurus*
Scopus_umbretta_FMNH_313701_	Other	*Scopus*
Spheniscus_humboldti_NHMUK_S_2000.7.1	Other	*Spheniscus*
Sterna_hirundo_NHMUK_NHMUK_S_1975.65.4	Other	*Sterna*
Streptoprocne_zonaris_FMNH_85767	Other	*Streptoprocne*
Strix_aluco_NHMUK_S2001.38	Other	*Strix*
Sula_dactylatra_NHMUK_1890.11.3.10	Other	*Sula*
Sylvia_borin_FMNH_385185	Other	*Sylvia*
Terenura_spodioptila_FMNH_344009	Other	*Terenura*
Tigrisoma_lineatum_FMNH_105528	Other	*Tigrisoma*
Tityra_semifasciata_NHMUK_1891.7.20.15	Fruit	*Tityra*
Tockus_nasutus_NHMUK_S_1989.2.2	Other	*Tockus*

Todus_mexicanus_FMNH_351174	Other	*Todus*
Topaza_pyra_FMNH_318845	Other	*Topaza*
Treron_capellei_UMMZ_220454	Fruit	*Treron*
Tringa_ochrophus_FMNH_368850	Other	*Tringa*
Trogon_melanurus_FMNH_290496	Fruit	*Trogon*
Turdus_olivater_FMNH_319675	Other	*Turdus*
Turnix_varius_NHMUK_S1952.2.142	Other	*Turnix*
Tyrannus_tyrannus_FMNH_487521	Other	*Tyrannus*
Tyto_alba_NHMUK_S1989.22.1_	Other	*Tyto*
Upupa_epops_FMNH_352821	Other	*Upupa*
Vultur_gryphus_NHMUK_S1955.5.11	Other	*Vultur*
Chloris_chloris_OUMNH_24626	SeedBeak-Finch	*Chloris*
Cornuropsis_carolinensis_UMMZ_68741	SeedBeak-Parrot	*Conuropsis*
Ectopistes_migratorius_UMMZ_alcohol	SeedGas	*Ectopistes*
*Geospiza_fulginosa*_NHMUK_A1975.15.25	SeedBeak-Finch	*Geospiza*
*Manucodia_chalybatus*_UMZC_436.K	Fruit	*Manucodia*
*ParadoxornisTimalia*_NHM1923.1.20.6_1945.14.1_2	SeedBeak-Finch	*Paradoxornis*
*Spizella_arborea*_NHMUK_1986.60.60_2	SeedBeak-Finch	*Spizella*
*Jeholornis_prima*_STM_3-8	Jeholornis	*Jeholornis*

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